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The Tenure of Land in Foreign Countries.

A CIRCULAR was addressed in the spring of last year by the British Foreign Office to the various representatives of her Majesty on the Continent, with a view to obtain information as to the tenure of land abroad, and principally to ascertain whether the custom of letting land on long building leases prevailed in foreign countries. Replies have been received from twenty-two ambassadors or their secretaries, accompanied in some cases by a short sketch of the law with regard to land in the country referred to, and these documents have been recently printed, by order of the House of Commons.

It appears from this return, which relates to Austria, Baden, Bavaria, Belgium, Denmark, France, Germany, Greece, Italy, Holland, Portugal, Roumania, Russia, Coburg, Servia, Spain, Sweden and Norway, Switzerland, Turkey, and Wurtemberg, that our system of letting land on long leases for building purposes is practically unknown upon the Continent. In Belgium, however, the practice has lately come into vogue, but is confined to Brussels, where the system was introduced by a French contractor, who erected buildings on certain sites in the central boulevards, which are the property of the municipality. As a rule, houses in Belgium are built upon freehold land, which is paid for either on entry into possession, or by instalments, or by annuities. The vendor has a lien on the building as long as the site has not been fully paid for. Companies have been formed in Belgium for the construction of artisans' dwellings, the tenant having the option of becoming the owner of the house he inhabits, by paying annually as rent a sum equal to the interest upon, and a sinking fund for the repayment of, the capital expended on the acquisition of the ground and the construction of the building.

In France freehold tenure is the rule, but in the capital and in most of the large towns land is frequently let upon building leases for varying lengths of term, dependent upon the commercial, industrial, and social conditions of the several localities. All feudal tenures were abolished by the Revolution of 1789, and all real property in France, whether urban or rural, is held in fee simple (*franc-aleu*); that is to say, as long as there is no contravention of public law, the right of owners of property is absolute to deal with it as they think fit.

According to recent statistics, land in France consists of some 28 million holdings, divided amongst 5 million owners. Each of these holdings can be sold or let at the pleasure of the owner; entail does not exist in France, and real as well as personal estate is divided equally.

In Germany and Austria leasehold tenure for a number of years is unknown. In Bavaria, the land is held by about 458,416 independent landowners (with 1,047,596 labourers), ranging from the small farmer owning only a few cows, and the peasant who works on his own land with his labourers, to the owner of large estates, whose possessions may be almost compared to those of English landlords. The average size of an estate, arable land or wood, in Bavaria is only 5·75 hectares, or about 14 English acres; in Hanover and Pomerania, 20·93 hectares, or about 52 acres; in Silesia and Brandenburgh, 16·36 hectares, or about 41 acres; whereas in England, out of a total area of 13,205,406 hectares, or about 33 million acres, not less than two-thirds are in the hands of 10,207 persons, each of whom owns more than 200 hectares, or about 500 acres. In Bavaria small estates are the rule, and when the electoral lists were prepared in accordance with the law of the 26th of May, 1818, there were only 7,182 landowners qualified to vote, that is, landowners possessing estates of the value of from 8,000 to 10,000 florins, or about 685*l.* to 857*l.* Apart from some instances of property being entailed, which can only occur among the nobility, the ownership of land in Bavaria has been treated since 1848 not according to feudal principles, but according to the principles of common law, which allows the owner the greatest liberty with regard to the disposal of his property.

In Germany generally house property is invariably held upon freehold tenure, and the system of letting land upon long building leases is practically unknown. This is, no doubt, due to the fact that, as a general rule of German law, now obsolete so far as Prussia is concerned, "sale breaks lease," and this being so, no person would be disposed to erect at his own cost a permanent structure upon land held upon such an uncertain tenure as a lease.

In Denmark it is the custom to purchase small plots of freehold ground for the purpose of building houses, and the leasing of land for a term of years upon condition that it is built over is altogether foreign to the Danish practice. It is, however, customary to lease lands and tenements for two lives, but in this case the tenements built by the lessee do not escheat to the landlord at the end of the term; the landlord has the choice of purchasing the buildings at a price determined by an official valuer, or of ordering their removal. Under this system of tenure, which is called *lifsfaeste*, the tenant acquires the property for his own life, and, if married, the widow has an interest in it for the term of her life. It frequently happens in Denmark that a peasant or cottager holding under this tenure marries a very young woman in his declining years or even upon his death-bed in order to extend the term of his lease. In this tenure rack-renting is not only illegal, but is opposed to popular custom. Land is also held in what is called *arvefaeste*, which is a kind of freehold or hereditary tenure. Of this there are two categories; one simple, whereby the lessee and his heirs, on payment of a yearly or quit-rental, enjoys a perpetual lease, barred only by failure of issue, in which case the property reverts to the lessor; the second is *in infinitum*, which leaves the tenant free to hypothecate or even to sell the property, subject, of course, to the payment of the rent. This tenure bears some resemblance to Ulster tenant-right and to the *emphyteusis* of the Roman law.

In former times it was not uncommon in Denmark for estates to be parcelled out into small holdings, which were let for building purposes on long leases sometimes extending over hundreds of years; but the tendency of recent legislation has been to discourage the creation of leaseholds and to promote the acquisition of freeholds. By a law passed in 1847, no part of a landed estate can be legally leased for a term exceeding fifty years, except under the two-lives tenure. In the moorlands of Jutland, however, it is not unusual for small holdings to be let for shorter terms for building; the tenements erected on these holdings by the tenant remain his property, and do not revert to the landlord. This custom is peculiar to Jutland, and the reason why these leases are preferred to purchasing the land outright, is that the expense of the stamp and registration expenses upon transfer of the freehold is avoided. In certain suburban districts of the capital it is customary to sell plots of ground for building encumbered by certain conditions called *servitut*, and this word is to be noted as one of the few instances in which a non-Scandinavian term is employed in Danish jurisprudence. The *servitut*, although a very comprehensive term, usually applies to the obstruction of the view, the erection of unsafe or unsightly buildings, or the carrying on of noxious businesses.

In Norway land is let at an annual ground-rent for building purposes either for a term of years or in perpetuity. On the expiration of the lease for a term of years the tenant remains the owner of any buildings built upon the ground, which he is at liberty to remove.

The system of letting land on lease for

building terms does not prevail to any great extent in Sweden: in the larger towns where the houses are built and let in flats the system does not obtain, the houses being invariably built on freehold ground; but in the country leases are not uncommon, though this is usually for agricultural purposes. The tenant has the right to remove any buildings erected by himself, all other improvements, such as cultivation, fencing, planting, &c., reverting to the landlord. The natural tendency of this state of the law is, if the buildings erected are useful and substantial, to bring about an agreement between the landlord and tenant, for the former to take the buildings over from the latter at a valuation. The only cases in which leases for building dwelling-houses are usual in this country are for plots in the neighbourhood of large towns or summer resorts. The general term for a building lease is fifty years, but shorter terms are not unfrequent, also for the life of the lessee and his wife if married, as in Denmark.

The condition of tenants in Greece appears to be more favourable than on the Continent generally, the landlord being boumd to keep the house in repair and to pay all rates and taxes. Freehold property is the almost universal tenure in Greece, every Greek being anxious to have a house of his own, and by law the sale of a house to a third party, as in Germany, determines the lease, and may lead to the expulsion of the tenant, who, however, has his remedy against the owner, and may claim damages.

The custom in the Ionian Islands with regard to the tenure of land differs from that which prevails in other parts of Greece. In the towns perpetual leases and leases for terms of years are granted; in the latter case, the term must not be for less than twenty years. If the lease is perpetual, no alteration can be made in the rent; the lessee in either case pays all taxes. The tenant is allowed to mortgage the premises in his occupation, but in the event of the landlord resuming possession, the latter is not liable for the mortgage. The tenant may transfer the property to a third person after having notified his intention to the landlord, who must give his decision within a month of receiving such notification. The new tenant must enter into a contract with the landlord with regard to the rent, and, failing this, the property reverts to the landlord. If the rent reserved is not paid within two months of its becoming due, the landlord has a right to eject the tenant. By a law passed in 1868 the tenant may become the owner of his house by paying the landlord the value, the rent being capitalised on the 6 per cent. table, or eighteen years' purchase. The practice of letting ground on building leases is at present unknown in Greece.

It appears from the report of Consul Franz, Her Majesty's Consul at Rome, that in Italy the system of letting houses and ground upon lease has been generally abandoned, in consequence of the facilities afforded by the laws of the country for the redemption of rent, which may be redeemed by the tenant on payment of a sum equivalent to twenty times the amount of the annual value of the premises in his occupation. Leases in the ordinary form are not permitted for a term exceeding thirty years by the Italian Civil Code, and it may be assumed from this fact that building leases are practically unknown in Italy.

With regard to the Netherlands, it appears from the short but extremely explicit report by Mr. Fenton, Secretary of Legation at the Hague, that property in land or houses in that country is held by the proprietor as freehold, no limited ownership such as copyhold or other similar tenure such as exists in England being known, and the system of letting or hiring land on building leases finds no favour and may be said to be almost, if not absolutely, non-existent in that country.

In Switzerland the English notion of degrees of ownership in land is not only absent from Swiss law, but is almost incomprehensible to the Swiss mind. Absolute ownership is the only condition known to them, and they can conceive no idea of such tenures as exist in England, such as leasehold for terms of years, copyhold estate in tail, and so forth. The question of farm leases is a separate matter: these are, in general, for short terms, and are generally renewed from year to year. It would be contrary to the Constitution of the country in many cantons, and notably in Berne, to subject land to periodical and irredeemable payments, such a practice savouring too much of feudalism. In the case of an intending purchaser being unable to pay the purchase-money or the interest thereon, the vendor is not entitled to resume possession of the land, but must recover the money as if it were an ordinary debt.

The laws regulating property in land in Spain and Portugal are similar in character. The practice of letting land on building leases is practically unknown in these countries; but there are certain distinctions with regard to tenures of real property. The feudal system of tenure never struck deep root in the Peninsula, and least of all in the ancient kingdoms of Castile and Leon, where it can scarcely be said to have existed at all. Spanish real estate was not wanting at the beginning of this century in certain characteristics, which bore some resemblance to a feudal relation to an over-lord, and which distinguished it from the more purely allodial and free tenures of the present day. Every trace of these ancient tenures was swept away by the Cortes of Cadiz in 1811, since which date real property in Spain has been untrammelled by any charges or conditions, with the exception of those arising from the testamentary disposition of the owner, or from contract with other parties. Spanish lawyers distinguish, however, between *dominio pleno*, or freehold, and *dominio menos pleno*, which is analogous in part to leasehold. The former term relates to property which is held absolutely and unencumbered by any extraneous charge or burden. The latter species of tenure is subdivided into (1) a tenure in which a periodical charge is imposed without a contract, and (2) a tenure by which an annual rent is paid to the landlord under a contract. Absolutely freehold is the tenure which most generally prevails in Spain, both as regards land and buildings, and there is no difference between town and country property. Land in this manner is transferred by sale, donation, or will, and no further relation exists after such transfer between the old owners and the new. In certain provinces, however, estates are more commonly held on conditional tenures, that is, subject to a periodical payment, called in Spanish *censo*, or to an ordinary rent. The tenure by payment of *censo* is subdivided into (*a*) *foros*, which is for a term, generally for three reigns and twenty-nine years more; and (*b*) *enfiteusis*, which is of a similar nature to the former tenure, but is of permanent duration. The tenant may alienate his holding on the understanding that the new tenant undertakes to hold the property on the same terms as his predecessor. The landlord has the right of pre-emption in the case of a tenant wishing to dispose of his interest.

The law with regard to land in Portugal is similar to that in Spain, and in this country, as in Spain, leases for a building term are unknown. *Aforamento* or *emphyteusis*, in the language of the Portuguese civil code, is the transfer in perpetuity by the owner of any real property of his right of use to another person, who undertakes to pay him annually a certain fixed sum. The rent is to be fixed by mutual agreement, not by any custom; the emphyteutic estate, although hereditary, cannot be divided among the heirs of the tenant except with the landlord's consent; the value of the tenant's interest in an estate is determined by an official valuation, and is distributed among the heirs of the tenant according to law. The heirs are required to decide among themselves upon which of them the estate shall devolve, and in case of dispute the question is decided by a court of law; if none of them desire to hold it, the estate is sold and the proceeds divided equally. A tenant may mortgage his interest in an estate without his landlord's consent, provided the amount raised by mortgage do not exceed the capitalised rent with one-fifth added. In the event of a sale by the tenant the landlord has a right of pre-emption, and in a similar manner the tenant has a right of pre-emption in the case of the sale by the landlord of his seignorial rights.

Owing to the want of statistical data with regard to Russia, it is almost impossible to obtain trustworthy information as to the tenure of land and buildings in that country, but it may be safely asserted that tenements in general, and especially in towns, are freehold, and it would also appear that the system of letting land upon building agreements does not prevail in Russia. From the circumstance that Russia is comparatively a thinly-populated country, with imperfectly developed means of communication between the towns, land is cheap, and the conditions of sale and tenures of real property are less complicated than in more thickly-populated countries. In Russia Proper mortgages are frequent; but there is no official register of these transactions. In Poland, on the contrary, an official record is kept of all transactions with regard to the transfer of land, and it is stated, on the authority of her Majesty's Consul-General at Warsaw, that the system of hypothec in force in Poland is admirable, and could hardly be improved upon. Generally speaking, every Pole lives upon his own freehold, which is almost invariably mortgaged at 5 per cent., with a sinking-fund, to the Crédit Foncier. The civil law in vigour in the Baltic provinces is based upon the Roman law, that in Finland upon the Swedish law, and that in Poland on the French Code Napoléon.

Landed property in Turkey is classified as follows: *mulk*, or freehold property belonging entirely to private persons; *mirié*, or Crown land; *mefcoufé*, or endowed property; *metrouké*, or land given up to the public for forming roads or common pasture: and *mevat* or waste land. *Mulk* property is of four kinds, viz., (1) that which lies within a commune or district, or within a limit not exceeding about a quarter of an acre outside the boundary of the same; (2) land, formerly Crown land, given to private individuals; (3) *Ushrié*, or titheable land divided at the time of the conquest of the country among the soldiery; and (4) *Haradjié*, or land the possession of which has been confirmed to non-Mussulman inhabitants. Land in Turkey is generally sold in small lots, so as to enable persons to build houses for themselves, but it is sometimes let for terms of years at a small annual rent, the buildings erected upon the land becoming the property of the landlord at the expiration of the term for which the land is demised. Such leases are rare in towns, but more rare in the country as distinguished from the neighbourhood of towns.

In Servia and Roumania building leases are unknown. In Roumania, the legislation is based upon the French civil code, the sale of land is unconditional, and reservations of rent are never made. At Bucharest, a large building society (La Société de Construction) has extensively stimulated the erection of new houses in that city, and for this purpose building sites have to be acquired which are invariably freehold, and cost from 1,000*l.* to 2,000*l.* and upwards, according to their situation.

Emphyteusis, literally an "in-planting," is a perpetual right in a piece of land which is the property of another: the right consists in the legal power to cultivate it, and to treat it as one's own, on condition of cultivating it properly and paying a fixed sum at stated times. Although the emphyteuta had not the ownership of the land, he had an almost unlimited right in the enjoyment of it, unless there were special agreements limiting his right. . . . . He could sell his interest in the land, after giving notice to the owner, who had the power of choosing whether he would buy the tenant's interest at the price which the intended purchaser was willing to give. In the case of the lessee's interest being transferred to a third party, a fiftieth part of the price, or of the value of the property, when the nature of the transfer did not require a price to be fixed, was payable to the owner on the admission of the new emphyteuta, which, as a general rule, was paid by him. If the owner of the land refused to admit the proposed

new tenant, the seller could, after certain formalities had been complied with, transfer all his rights without the consent of the owner. The lessee was bound by the Roman law to pay all public charges and imposts, and to keep the property in proper order, and to pay the rent regularly. The tenant could dispose of his interest by will, and, in case of intestacy, it passed to his heirs in the same manner as other property. The lessee might lose his rights by surrender to the owner, by failure of issue, by injuring the property, by non-payment of rent or taxes, or by alienation without the consent of the owner.

RECENT RESTORATIONS OF THE PERGAMENE ALTAR.

BY JANE E. HARRISON.

UNTIL the opening of the South Kensington Cast Museum the fame of the sculptures of the great altar of Pergamos was in England, to all but professional ears, little more than a rumour. Visitors to the British Museum will have seen in the archaic room two startling fragments, a pain-stricken giant, and a torso ending in snake coils; but in their isolation these fragments have been more wonderful than comprehensible. Now, at South Kensington, the two principal, and in a way central, groups of the frieze may be seen side by side in their entirety, and a fair notion of the general scope and style of the sculptures may readily be formed,—I say *may*, but I might easily say *must;* for, of all the varied contents of the Cast Museum these colossal slabs are, with their sensational style of beauty, most sure to catch and rivet the eye of the untrained gazer. The literature of the Pergamene altar is likely from this time on to be a matter of public as well as professional interest.

The two books* before us are of widely different import and character; the first is professedly popular, the second learned and technical. I take them advisedly together, because my advice is, read the first that you may understand the second. Dr. Trendelburg's work (offered as homage to Dr. Curtius on his seventieth birthday) consists of six beautiful phototype plates, representing groups from the frieze, and an accompanying text. The plates are taken from the six principal groups, *as restored by A. Tondeur.* It need scarcely be said that the originals have been left untouched, and the restoration attempted only on casts. Dr. Trendelburg hopes that his work will serve a double purpose: first, it will make the Pergamene altar known, in intelligible form, to those lovers of art to whom the originals, and even the casts, are inaccessible; and, secondly, it will facilitate the enjoyment of, and even the scientific study of, the fragmentary originals. Any who have pored laboriously over these shattered originals will be ready to thank Dr. Trendelburg, and to add their testimony to the usefulness of his work. In looking from fragment to fragment, the eye and the imagination and the reason are all heavily taxed, and to have the effort of one's fancy caught and permanently visualised is no light gain. Of course in any matter of restoration there will be differences of opinion as to details: these the archæologist will weigh and ponder for himself; but for the general student a clear idea of the composition, even if a detail or two be faulty, is of the highest importance, and even to the archæologist himself is a help not to be disdained. The way to use Dr. Trendelburg's excellent book to the best advantage is to place side by side with his restored plates photographs of the original fragmentary slabs, and then to judge for oneself of the justice of his restorations.

Though Dr. Trendelburg's book is avowedly a popular one, the text does not confine itself to a mere explanation of the plates and enumeration of the restorations. The introduction is occupied with the altar as a whole, the meaning of the Gigantomachia frieze, and its relation to certain architectural peculiarities in the structure. Further, with reference to each of the restored slabs, we have a great deal of valuable criticism on the composition of the groups, the technical treatment of the reliefs, some light thrown on the position of the sculptures in the history of art; and last, but nowise least, more than one *excursus* into the somewhat obscure and unknown tracts of Pergamene mythology. The book is an excellent proof that it is possible to be very learned without being the least unreadable.

I shall confine myself, in the main, to Dr. Trendelburg's remarks on the two groups now to be seen in the South Kensington Cast Museum. I have said that these two groups are, in a sense, the central groups of the frieze; but, of course, to speak of the central group of a frieze would be to condemn the composition offhand; rather, as Dr. Trendelburg beautifully suggests, we may regard the two groups as two richly-wrought clasps that bind together a lovely, sculptured girdle. Their place was, no doubt, in the east, *i.e.*, the principal front of the altar. The two groups are manifestly composed to balance each other, and each represents the moment of supreme victory; the one the victory of Zeus, the Saviour, to whom the altar was dedicated; the other, of Athene, the Victory-bringer (Nikephoros), his warlike daughter. The composition of the Zeus group sways to the left, that of the Athene group to the right, though each is finely balanced within itself. The Zeus group claims our first attention. To Zeus, and Zeus only in all the Olympian phalanx, are allotted three opponent giants; such was the convention of Greek art from the time of black-figured vase-painting. In the three opponents there is a fine gradation of defeat. To the left, utter defeat in the figure of the prostrate young giant, beautiful and in completely human form, smitten in the thigh by the burning thunderbolt whose flames are already bursting out to catch the giant's shield. Probably in the original this flaming thunderbolt was a good deal helped out by paint. To the right of Zeus is a second giant, also of human form, just smitten, but by no thunderbolt; he bears no weapon himself, and Dr. Trendelburg thinks he has cast away sword and shield that he may spring forward to seize and bear away the ægis of Zeus, but too late, for already the Gorgon's eye is upon him, and he stiffens into stone. To give in stone the effect of stiffening into stone was a *tour de force* which just suited the Pergamene artistic temper. The third giant is still in mid-fight, but defeat is obvious and certain: against the second thunderbolt of Zeus he can only uplift a helpless stone. This giant's form ends in serpent coils, and the triple contest is somewhat quaintly closed by a fourth impending fight. The eagle of Zeus, alert with open beak, watches to pounce, if need be, on the head of the angry rearing snake. This little episode occurs more than once in the frieze. Prominence is given to the figure of Zeus very simply, but finely and effectively. He is taller than his opponents, and alone towers erect above them. He is with his body full face, and both arms are wide outstretched so as to fill as much as possible of the field. The dying giant is in profile, the gorgon-struck giant is turned three-quarters face. The giant with the stone in actual conflict with Zeus turns his full back, with outstretched arms to balance his divine opponent,—everywhere a balance of pose and line, which is, to say the least, astonishingly clever. The actual opponent of Zeus is a bearded giant,—maturity fitly contends with maturity. The eye of this same giant is hollowed out, and probably contained a pupil of enamel, or some fiery precious stone, which would greatly enhance the wild and terrible look of the face.

In the corresponding group of Athene, the victory-bringer, we have composed in similar fashion the goddess and three figures to balance her. But not three combatants: though she is goddess of war, Athene is a woman, and it is enough if she contend with one giant, and he the youngest of the brood. He holds no weapon, his hope is only in flight: he has two swift wings, but his form is otherwise human; the goddess has overtaken him and caught him by the hand, but it is not she who slays him,—she sends her sacred snake to bite him in the breast. In the remainder of the frieze we see many goddesses deal death-blows, sometimes in very brutal fashion, to their foes, and we feel that it was a fine thought that gave to Athene only victory the end, not slaughter the means. Athene strides on to the right, and balancing her the figure of Nike, goddess of victory, flies to the left to crown Athene. Between them necessarily is left a large triangular space. The sculptor has skilfully filled it by the most pathetic figure in the whole frieze. The giants are earth-born, and in this their last extremity, when her youngest son is in dire peril, out of the earth comes his mother, Ge herself, with uplifted hands. But the mother pleads in vain to the—

> "Daughter without mother, born of god."

Athene vouchsafes not even a look, but passes swiftly on in her triumph. It is Dr. Trendelburg's fancy that the giant is Ge's youngest, best-loved son, most like his mother in the face, and the fancy is so charming that I scarcely like to say I do not feel sure it is founded on fact. Ge has her name written near her, and her customary attribute the cornucopia; her character as earth-mother is well shown in the full figure and rich abundant hair. The wings of the Victory cleverly balance the wings of the falling giant.

The remaining groups I must note only in passing. By far the most beautiful is that of Helios, the sun-god, rising in his chariot from the waves, a motive clear to all lovers of the Parthenon marbles; beneath the horses of Helios lies a prostrate giant, perhaps the most beautiful figure in the whole frieze. A giant confronts the chariot horses, and seeks in vain to check them in their course. To the Greeks the myth had its obvious interpretation; in vain was the onset of barbarism and darkness against the dawn and clear shining of Hellenic light and culture and freedom. To the left preceding the sun-god rides his herald the Dawn (Ἠώς). Her horse looks back to the coming sun, and the face of the dawn-goddess herself should, as Dr. Trendelburg rightly observes, be turned back, though the restorer has made it face forwards. The deities of light abound throughout the frieze.

Another noticeable slab shows the conflict between the triple-bodied Hekate, with her flaming torch, and a giant upheaving a huge rock; also the fight of Orion and Artemis, in which, as the story went, the young giant was disarmed and vanquished by love for the maiden goddess. Only one other group I must note, because to its understanding Dr. Trendelburg makes an important contribution. This group contains the figure of a goddess who has become familiar to German critics by the not too commodious name of the snake-encircled-vessel-hurler (*Schlangentöpfwerferin*). A tall, powerful, matronly-looking woman seizes a half-giant by the shield with her left hand; with her right she is about to hurl at him a round vessel, something like a curved flower-pot with a small snake curling round it. She is aided in her attack by a huge serpent. This figure has long been a crux to archæologists. It was not difficult to give a name to goddesses who carried such customary emblems as sword and spear, torch and bow, but this snake-encircled vessel was not of so easy interpretation. Some, judging from the snakes, called her a fury; others a Bacchant; a third party held that we have here a recondite allusion to an attack made on the navy of Eumenes by an enemy armed with vases full of snakes. Dr. Trendelburg breaks new ground. He thinks, in the first place, that sufficient attention has not been paid to the sacred fillets (στέμματα) with which the head of the goddess is adorned. These would make her out as of some solemn special import, a deity of some definite ritual significance. Further, the shape of the vessel, he thinks, is such that it could have been used neither for drinking out of nor for drawing water;

* Die Gigantomachie des Pergamenischen Altars, Skizzen zur Weiderherstellung derselben, entworfen von Alexandeur Tondeur, erläntert von Adolf Trendelburg. Berlin: Wasmuth. 1884.

Ueber die Künstgeschichtliche Stellung der Pergamenischen Gigantomachie von Henrich Brunn. Berlin: Weidmannische Buchhandlung. 1884.

it is of considerable thickness and weight. In a word, he concludes it was a mortar.* The mortar was an attribute naturally of the gods and goddesses of healing; in the mortar, as we know from the comedy of Aristophanes, the *Ploutos* (which lets us into so many of the mysteries of ancient medical practice), the god Asklepios compounded his medicines. The female goddess Hygieia is the daughter and constant companion of Asklepios, but the Pergamene figure is too matronly for Hygieia, the maiden. Dr. Trendelburg thinks it may represent Epione, the wife of Asklepios, a less frequent figure in ancient art. All he asserts positively, however, is that a goddess, wearing fillets and carrying a mortar, round which is curled a snake, attended also by a large serpent, must belong to the cycle of the medicine deities. The conjecture is doubly interesting, because from its temperate climate, fine situation, and abundant water supply, the place was a natural medical resort: it had medicinal springs and great facilities for sea and river bathing, and, in fact, a regular hydropathic establishment sacred to Asklepios. The subject of Asklepios worship in connexion with Pergamene worship has been recently discussed by Mr. Warwick Wroth, who has made the mythology of Asklepios peculiarly his own, and it will be interesting to know if he confirms Dr. Trendelburg's conjecture.

Turning to Dr. Brunn's monograph, one is in a different atmosphere, and at first in a controversial one. It is well known that it was the peculiar merit of Dr. Brunn that in his history of the Greek artists, published in 1857, he collected together, with considerable insight and an instinct almost prophetic, all the scattered evidence, literary and monumental, of the Pergamene school. He, and at first he only, saw the unity of style, which linked together, as the outcome of one tendency, work so seemingly different as the Laöcoön, the Farnese Bull, the so-called Dying Gladiator, the Ludovisi Gaul, and the votive groups of Attalus. Now, nearly thirty years later, comes the discovery of the great altar of Pergamos, and threatens with sudden eclipse the conclusions so laboriously arrived at from these scattered statues. Dr. Couze asserts, with a boldness he probably now regrets, that if we would concern ourselves with the art of Hellenistic times, this altar of Eumenes must be the centre point of our study. It is scarcely to be wondered at that in the joy of so great a discovery, and so splendid an acquisition, sound judgment was thus led astray.

Dr. Brunn was not likely to let such a statement pass unchallenged; valuable he owns these altar sculptures are, but they are, after all, mere decorative work, and cannot rank as a standard by which to judge sculpture in the round; and,—still more important point,—these sculptures are securely dated in the reign of Æumenes II. (196-175 B.C.). How absurd, then, to use them as criteria for the Alexandrian art of the third century B.C. Dr. Brunn passes from his polemic against Dr. Couze to an elaborate analysis of the sculptures themselves; this it would be fruitless for me to follow as it can only be appreciated when the sculptures themselves or complete casts from them are before our eyes. But his conclusions I may shortly summarise. Thirty years ago Dr. Brunn distinctly affirmed that in the art of the early Pergamene and Rhodian schools, the art which produced such works as the "Dying Gladiator," the possibilities of pathetic expression had reached their utmost goal, any further manifestation must degenerate into affected mannerism or fantastic licence. This dictum Dr. Brunn holds is fully borne out by the discovery of the Eumenes altar frieze of the second century B.C. In spite of its undeniably sensational splendour, we have in it no fresh outcome of the Greek spirit; it is but an ingenious compilation of foregone artistic motives. The style of such a compilation is at best but a skilful mannerism. Dr. Brunn illustrates his point by an ingenious comparison between sculpture and rhetoric. In Asia Minor, during the third century, B.C. there was a school of rhetoric, the chief representative of which was Hegesias of Magnesia; of him it was said that he sought to give effect to his oratory by the ingenious manipulation of the rhythm of his sentences, altering the natural order of the words for the sake of effecting a recondite juxtaposition. Such eloquence might startle the attention of the hearer, but it could neither persuade his intellect nor kindle his emotion; it was, in fact, no true eloquence at all, but mere effective declamation. As was the Magnesian rhetoric to the true Athenian eloquence, so was this later Pergamene art to the ideal creations of Pheidias. It created nothing, it did but dexterously manipulate already-existing material with a view to sensational effect. It laid hold of an artistic vocabulary already complete, and expended it with a prodigality that was often vulgar, always wasteful (*vitiosa abundantia*, Cic.); it decked out a trite and commonplace thought with the apparatus of ready-made artistic formularies; having within itself no luminous thought to convince, no passion to persuade, it sought to dazzle the spectator with the flash of mere meretricious splendour, to goad his emotion with the constant stimulus of mere physical pathos.

Having thus dealt hard,—but I believe perfectly just,—measure to the Pergamene sculptures as expressive art, Dr. Brunn does not deny to them their full meed of praise as effective decorations. Their fantastic manner, which is *expressively* so barren, is often decoratively successful and perfectly permissible; wings not meant for the earth-born giants to fly with, and therefore expressively bad, yet fill the given space with excellent decorative effect; the more fantastic the form often the better it is as a mere complex of lines,—a mere pattern. How essentially decorative the frieze is, how little a part of the tectonic framework of the building, one can see at a glance; it is not born out of the basis it encircles, it is rather stuck on to it. Its nearest analogy is, as Dr. Brunn shows, the frieze of the Erechtheion. In the Erechtheion the architectural frieze is of dark Eleusinian stone, the sculptured decoration is clamped on and made of different material, *i.e.*, white marble; obviously no integral unity was intended. In fact, both in the Erechtheion and in the Pergamene altar the frieze appears, so to speak, in duplicate, the background of solid stone, and the vitalised version of it rendered into sculpture. This double rendering gives to the frieze a strength and substantiality which, in the case of the Pergamene altar, is much needed, as the heavy weight of the superimposed Ionic colonnade would to the eye seem otherwise insupportable. The sculptures of a frieze so composed, not being part of the architectural structure, are not really in relief, and are therefore free to a great extent from the laws of relief composition. Hence the prevalence of startling full-front and back views in the Pergamene frieze, and also, so far as can be judged from the fragments in the Erechtheion frieze, contrasting so markedly with the "profile" composition of the Parthenon. If one may regard, as Dr. Brunn does, this Pergamene frieze as a sort of second rendering of its own background, not as worked in relief on that background, certainly all the decorative distress of the composition disappears; from a mechanical point of view the grouping is successful: it is static, well balanced, and therefore well suited as a support for the heavy superimposed weight. But probably many will think Dr. Brunn's theory fanciful, though they had better read his criticism in detail before they disallow it.

To sum up, he characterises the Pergamene frieze as a great epideiktic effort, a sort of final and sensational panorama of the outside aspects of the art of the past, and, concluding with a second ingenious metaphor, he adds:—"Comparing Greek art as a whole to an architectural structure, we may say, with a double significance, that the younger Pergamene school in the sculptures of the Gigantomachia effected thus much,—to the proud edifice of the history of Greek art it added a new decorative member which was at once its crown and its close."

* Since the above was written a paper has appeared in the last issue of the *Archäologische Zeitung*, in which Dr. O. Puchstein contends that the supposed mortar is really a fragmentary hydria. This is a question for experts to decide.

IMPROVED WATER SUPPLY FOR THE METROPOLIS.

THE important Parliamentary paper recently issued under this title, contains a report* by Mr. J. Thornhill Harrison on a project designed by himself by which the metropolis is to be furnished with what is considered to be a perfectly pure water in lieu of the present supplies from the Thames, which are complained of as impure. As far as the report goes, the project deals only with the volume now drawn from that river, which contributes 50 per cent. of the whole quantity. That taken from the basin of the river Lea, amounting to 38 per cent., does not come under consideration. The proposal is recommended on the grounds,—

First. Of the *quality* of the water, which is said must be of the purest, inasmuch as it will be drawn directly from the chalk at a depth of from 10 ft. to 20 ft. below the surface, through which it has filtered from a widespread and elevated gathering-ground.

Secondly. That, as regards the *volume* obtainable, it is asserted that there is at command at least double the volume at present withdrawn from the Thames; and

Thirdly, that there will be an annual saving in cost, owing to the absence of any necessity for filtration, and to a large reduction in the expense of pumping, while the area now employed for reservoirs and filter-beds would be left at the disposal of the companies for other purposes. It is thought also that Parliament would relieve the companies from the present annual payments of 10,000*l.* to the Thames Conservancy Board.

The proposed source of supply is that part of the chalk formation within the watershed of the Thames lying to the north and west of Windsor, including the areas within the basins of the rivers Kennet and Colne, and measuring about 1,100 square miles, the elevation of which varies from 100 ft. to 600 ft. above Ordnance datum. The rainfall within that area ranges from 24 in. to 36 in., from which it is calculated 400 million gallons are daily discharged into the Thames; but as the water absorbed *into* the chalk travels *through* it very slowly, it is probable that months, perhaps years, may elapse before some of the rain falling and absorbed on the highest portions of the chalk area would find its way to the river, and consequently in that area there exists a very large subterranean reservoir, which, it is conjectured, forms the gathering ground for the chief perennial supply of water to the Thames below Wallingford.

In support of that theory Mr. Harrison affords an interesting explanation of the present geological features and of the disturbances which must have occurred to create the faults which exist in the chalk formation, and which, by intercepting the subterranean flow, help to form the great reservoir of water contained in it. In order to illustrate more clearly the character of the district whence he proposes to gather the required volume, he prepared a model, representing an area of twelve square miles, with Windsor in the centre, and showing the inclination of the chalk formation with superincumbent beds, and the manner in which the drainage from it must flow into the Thames on the assumption that it cannot escape to the sea by passing under London.

The mode in which the water is to be collected consists in constructing a large receiving-well at "Black Pots," near the main road from Eton and Upton to Datchet, with an overflow into the Thames, below the Windsor Lock. From this it is proposed to drive a tunnel below the summer level of the Thames, in the chalk, and below the gravel, westward to the river near Bray, the dimensions of which are to be 12 ft. in diameter, gradually diminishing to 6 ft., with a slope of $1\frac{1}{2}$ ft. per mile. In regard to the quantity of water obtainable at Windsor, Mr. Harrison

* Return to an Order of the Honourable the House of Commons, dated Dec. 2nd, 1884, for Copies of Reports made to the President of the Local Government Board, by Mr. John T. Harrison, M.I.C.E., as to "Sources of Water Supply for the Metropolis." London: Henry Hansard & Son.

gives the results of certain gaugings taken in April and July last year, from which the accretion between Windsor and Datchet is calculated to have been 250 million gallons in April, and 55 millions in July, which last, however, he considers to be too low, and himself estimates at 116 million gallons. In order to convey the water to the works of the Companies, who now pump their supply direct from the Thames, the suggestion made is to build a main-carrier 12 ft. diameter from the well at Black Pots to Hampton, eleven miles in length, with shafts at every quarter of a mile, and an "overflow-weir" placed several feet above the summer level of the river, so that the water may be conveyed in 4 ft. iron mains to the pumping wells of each company, two of the mains having to be carried across the Thames. The whole cost of the scheme, inclusive of land and distribution works, is estimated at 700,000*l.*

Mr. Harrison himself is careful to explain that he abstains from expressing any opinion on the objections to the quality of the present supply, and therefore he may or may not acknowledge their validity. Were the supply of London a subject of discussion now for the first time, or were it simply a question of an additional volume, this scheme would, of course, deserve serious consideration, especially when put forward by such an authority as Mr. Harrison, but in its present shape it is unquestionably open to the fatal objection of leaving half the metropolis exposed to the contingency of having its water supply suddenly cut off by injury to its single main duct, arising either from accident or design. In these days of dastardly and secret outrage, when miscreants do not hesitate to attempt the destruction of a massive structure like London Bridge, the much simpler proceeding of blowing up the main water conduit at one of the quarter-mile shafts, and so depriving two millions of inhabitants of a daily necessary of life, would be much too fascinating a crime to be withstood. It was a possibility of this kind which was urged as one main objection to the proposal of leading water to London from distant sources like the lakes on the Welsh mountains. It must be remembered, too, that one of the set-offs to the cost of the proposed scheme is the abolition of reservoirs and the conversion of the areas now occupied by them to some other profitable use, so that there will be no storage in reserve whence a supply could be drawn pending a stoppage in the aqueduct.

But what proportion of the consumers constitute the "many" who are said to complain of the quality of the existing supply? The probability is that the objectors would be found to represent a very small percentage of the community.

After all, as has been often pointed out in the columns of the *Builder*, the main criterion of the wholesomeness or otherwise of the water is the actual, not the possible, mortality, which is traceable to the present supply, not that which gets defiled in the cisterns in which it is allowed to stagnate in close proximity to sewer or other foul gas, but to that which is drawn direct from the Companies' mains.

There is, moreover, a doubt as to the available volume of water at Windsor, as measured by the quantity said to imperceptibly enter the Thames between Maidenhead and Ditton, and to vary from 250 to 55 million gallons. Mr. Harrison's estimate of 116 million gallons is apparently obtained by assuming that the previously recorded minimum of 350 millions is not so correct as Messrs. Taylor's measurements last year. But it is at least possible that that recorded minimum may, after all, be correct, and in that case the estimated quantity of 116 millions would be in excess by 100 millions. If so, then what will be the state of London as regards water if it is to be dependent on the springs which furnish a portion of that volume?

But there remains the further question as to the effect which will be produced in the district from which the supply is proposed to be drawn. Protests on that score have already begun to appear against the scheme as projected, and though the effect on the Thames itself below Teddington Weir will be the same whether the present daily volume of 80 million gallons be drawn by the Companies direct from the springs at Bray or from the river itself at Hampton, it is quite possible that so large a draft on the higher level may make a very serious difference to the navigation of the *intermediate* reaches, and should it therefore be found that the quantity of water so withdrawn affects the general contribution of the springs to the river, its conservators would scarcely consent to forego the annual 10,000*l.* which they now receive from the companies, even if they did not insist on a restoration of the volume necessary to maintain the navigation in its present state. Whatever other shape it may be capable of being worked into on further consideration, the scheme does not, as it now stands, commend itself as a substitute for existing arrangements.

NOTES.

FROM the letter of "One of the Chapter" in the *Times* of Wednesday, in continuation of the Peterborough Cathedral dispute, and the subsequent admissions of the Dean, it seems pretty plain that not only the Canons, but the Dean himself, did very distinctly give the world to understand, when they first asked publicly for funds for the repair of the tower, that nothing was intended beyond numbering the stones, taking them down, and rebuilding them as they stood. Of course, it is quite open to the Dean and the Restoration Committee to say, "Behold, we show unto you a more excellent way"; but it can hardly be open to them to say, or let Sir E. Beckett say for them, that there was no such understanding. The argument, if so it can be called where argument there is little, is continued by a long letter from Mr. Thackeray Turner, who seems to think his position as hon. secretary to the "Anti-Scrape" Society constitutes him an authority on architecture, and who effuses over the beauties and perfections of the levelled tower. It is remarkable by what class of correspondents the *Times* columns are always crowded in these cases. A lawyer, whose foible is omniscience; a sketching parson, who draws towers of his own and calls those of Mr. Pearson monstrosities; and the amateur secretary of a society that talks twaddle over every old wall that is pulled down,—these are our architectural instructors in the leading journal. However, the conductors of that print, from the leader on the subject last week, do seem to have a dawning sense that it is possible to have enough of Sir E. Beckett's letters. From the latest of these effusions, by the way, it appears that Sir Edmund rates each man's right to an opinion on the subject in proportion to the money he has subscribed: a "canon of taste" certainly worthy of its author.

IT appears from a return recently presented to both Houses of Parliament that the practice of letting land upon building leases for long terms is almost entirely unknown upon the Continent, and that in the few countries where the custom prevails it is only to a very limited extent in large towns and their neighbourhood, and that the buildings erected by the tenant upon the ground demised do not escheat to the owner at the expiration of the lease, as is the case in Great Britain. The tenant is, moreover, in most Continental countries protected by a custom resembling Ulster tenant-right; he can dispose of his holding by giving notice to the landlord, and has the right of pre-emption at a fixed number of years' purchase of the annual rent. The most common tenure of land in foreign countries is freehold, and no evils appear to have resulted from the absence of leases with restrictive covenants, which are relied upon by the opponents of land reform in this country as being necessary for the welfare of the community, and the protection of the weak against the strong. There do not appear to be any records to fix the date when the custom of leasing land for terms of 99 years took rise in England, but it is not improbable that it began in the latter part of the sixteenth century, when the nobility gave up their London houses and removed westward. Their estates being entailed it was, of course, impossible to sell the ground in parcels if it had been desired to do so, and it is readily conceivable that the practice of letting upon a long building lease originated under these circumstances, and being found convenient, the practice was followed by corporations, and afterwards by private persons.

AT the meeting of the Royal Institute of British Architects last week (theoretically a private meeting), a very important donation was announced, that of a coloured copy of the great work got up by the French Institute, under the auspices of Napoleon, as a memorial of the expedition to Egypt at the close of the last century. The work, entitled "Description de l'Egypte, ou Recueil des Observations et des Recherches qui ont été faites pendant l'Expédition de l'Armée Française," consists of twenty-three volumes, dealing with antiquities, natural history, and geology, &c. It is on record that a company of the most eminent scientific men of the day accompanied the army, and carried their paraphernalia on donkeys, and when the regiment formed square to repel an attack, the cry was, "*Savants* and asses to the centre." However, the doings of the *savants* are now more important to us than those of the soldiers. At the same meeting a member put forward a suggestion that the library-books should be open to all comers to take them down for reference, instead of obtaining them through the librarian. There would soon be a fine confusion in the library if that were done. Those members who quoted the example of the British Museum Reading-room must have had scant experience there, if they suppose every reader replaces a reference-book when he has used it. There is an absolute want of conscience on the part of many readers in this respect; books are constantly taken out and kept the whole day by readers who only wanted them for a single reference. The Institute Library will be of far more use to members if the books are kept in thorough order, and they never will be except under the tutelary care of the librarian. A very few careless and disorderly persons would soon introduce hopeless confusion in the placing of the books. Mr. F. R. Farrow, the holder of the Godwin Bursary for 1884, read part of the report of his tour, which will be published in the Transactions shortly. The report was very highly spoken of by Mr. I'Anson and others.

UNREMITTING efforts are being made by the Railway and Canal Traders' Association to bring before the public the effect of the proposed new Railway Bills. With a view of disseminating information on the subject, prior to the Cannon-street Hotel conference they circulated a very exhaustive statement showing the principles and aims of the Bills, which are condemned most vigorously. It is stated that they are not even what they profess to be in the preambles,—they do not provide a "simplified system of charge,"—and an elaborate appendix is given to prove this. The mileage rates of five of the eight companies concerned are identical, two more have a slightly differing scheme, and one, — the North-Eastern, — an entirely different one. There can be no doubt that this want of uniformity will go far to destroy the usefulness claimed by the companies for the measures, and until they all agree and all the other lines adopt the same system, there must be endless confusion, especially as regards through rates in which several lines are interested. The fact that the companies seek for powers to charge for "terminals" is looked upon by the Association as rendering the mileage scheme quite worthless, as there would be so much vagueness about these additions that the public would be as much in the dark as before as to the real extent of their charging powers. But the companies offer to show in their rate-books at each station or wharf a statement of the amount of terminal charges at that station or wharf. This is a step in the right direction, and the Association ought to give the companies credit for it. It is notice-

able that the companies introduce into these schemes the classification of goods as compiled by the Railway Clearing House. This divides all goods traffic into eight classes, and, though it has long been used by the railways, it has never received Parliamentary sanction.

THOSE of our readers who have read what Mr. Ruskin calls the terminal letter of "Fors Clavigera," with the dainty little frontispiece by Miss Kate Greenaway, may remember "the beautiful city of Bassano on the Brenta between the mountain and the plain," where the Signora Zanchetta passed the eighty-five years of her busy, happy, and useful life, and where, if we can credit Mr. Ruskin's gossiping correspondent, people occasionally live to more than one hundred, and not unfrequently to eighty or ninety years. The municipal authorities are about to demolish the fortifications of this singularly favoured city, which date from the fourteenth century, and are said to be in an excellent state of preservation. The proposed action of the municipality has given rise to some opposition on the part of the local archæologists and artists, and Signor Giacomo Boni, a Venetian architect of some repute, referred to the proposal in terms of disapprobation at the inaugural meeting of the winter session of the Venice Athenæum. The Italians, as a rule, have very slight regard for Mediæval antiquities, and only recently a large portion of the walls of Brescia was pulled down in order to provide a suitable entrance on the occasion of a contemplated visit from the King, which, however, did not take place.

THE Japanese village which has been conveniently arranged under cover in the vicinity of Albert Gate will probably be an object of attention, and a sort of agreeable lounge for the curious, until the more important attractions of the season are in full swing. For those who would go to such an exhibition for the study of Japanese art or domestic architecture there is not really much to attract. They can see a carver transferring a design to wood by cutting through the thin paper on which the design is traced, and which overlays the wood; a carpenter planing by drawing his plane to him instead of pushing it from him (Japanese do everything the reverse way to other people); he can see studious silent persons painting fans with the left hand or right hand indifferently; and he can see for himself the lath and paper kind of dolls' house construction which is used in ordinary Japanese habitations, and how the houses stand on so many legs like a stool. It was amusing, too, in the theatre, to witness a kind of pantomime dance executed by a heavily-draped lady with a fan in her hand, and to realise how much nearer to life some of the Japanese drawings of men and women really are than might have been supposed, even to the peculiar twist or "kick-out" of the skirts of the dress which is so familiar to us in Japanese drawings of women. But, of course, the best class of Japanese art-workmen do not come over in this kind of *entourage;* and a good deal of modern work may be seen which seems to represent the Soho bazaar element of Japanese work. Nor do we much admire the system of arranging men and women in booths to make a show of them. They do not look as if they liked it; but that, we suppose, is considered in the bill.

COUNT ENRICO GRITTI has recently presented to the city museum at Venice the banner which was carried on the prow of the barge of his ancestor the Doge Andrea Gritti.

ACCORDING to the *Courier de l'Art*, the "Société des Artistes Français" is in considerable alarm in regard to the possible effect on the *Salon* of the establishment by the State of a *Salon triennial*, the first opening of which will take place next year, so that there will be two *Salons* in Paris in that year. They are in some fear lest the triennial *Salon* should injure the old and recognised annual *Salon*, both in drawing away works which would otherwise have been sent to the annual *Salon*, and possibly in encroaching upon the space hitherto allowed to the latter in the rooms of the Palais de l'Industrie.

A MEDAL has been awarded by the jury of the "Exposition des Arts Décoratifs" at Paris, to M. Adolphe Guillon, whose admirable drawings from the sculpture at Vézelay we had the pleasure of publishing in December, for "reproductions des vieux carreaux."

THE new number of the *Edinburgh Review* contains a paper of considerable interest on "Recent Discoveries in the Roman Forum."

A COURSE of free evening lectures on subjects connected with building is announced to take place at Carpenters' Hall, London-wall, in the months of February and March. The lecturers will be Professors Kerr (of King's College), Church (of the Royal Academy), and Bonney, Corfield, Kennedy, and Roger Smith (of University College), with Mr. Blashill and Mr. Slater. The subjects will be of a nature to interest and instruct not only artisans, for whose benefit the course is primarily intended, but also students of architecture, surveying, and building; and the Carpenters' Company wish it to be distinctly understood that the attendance of all persons in any way interested in, or connected with, the art of building is cordially invited. These lectures form a kind of sequel to the exhibition of carpentry and joinery held last year by the Carpenters' and Joiners' Companies in the same Hall; and should they prove successful it is likely that they may be followed by other efforts to promote a knowledge of the principles of good building among those whose occupations render such knowledge of importance to them.

M. EUGÈNE MÜNTZ, *lauréat* of the Institute of France, and curator of the Library and Museum of the École National des Beaux-Arts, was appointed to succeed M. Taine in the "Cours d'Histoire et de l'Art," and gave his opening lecture on Wednesday, the 7th, in the Hemicycle of the school. After a tribute to his predecessor, he entered into the subject of the part played by archæology, history, and æsthetic in the study of the monuments of the past, combating what he considered to be the false antagonism which has been set up between archæology and æsthetic. In speaking further of the varied influences of climate, race, and tradition on the development of the fine arts, he emphasised the part which was to be attributed to the constant and regulated discipline of the French school, in the artistic exeellence of that country, and after sketching briefly the succession of the great schools of art in Europe, concluded by a concise review of the principal historians of art, from Pliny the elder to our own day. M. Müntz will take for his subject for the year "La première Renaissance Italienne."

A SOCIETY, calling itself the Strand Improvement Association, has issued a coloured lithograph from a drawing by Mr. H. W. Brewer showing in a bird's-eye view a suggested alteration in the thoroughfare of the Strand between Somerset House and the Courts of Justice. The proposal is of an ambitious character, and apparently aims at nothing less than the entire reconstruction of the northern side of the Strand between St. Mary-le-Strand and the gateway of Clifford's Inn. A crescent is proposed to be formed on the north side of the Church of St. Mary-le-Strand, and an enclosed garden laid out in front of the Church of St. Clement's Danes, Temple Bar being reconstructed and made into a gateway to the garden. The total cost of this improvement is roughly estimated at one million and a half, but as there is no plan showing the extent of the property which would be affected it is impossible to offer any opinion as to the sufficiency of this estimate. No provision is made for supplying what is really an urgent want, namely, a new approach to the Courts of Justice from the north, and the only effect of the suggested improvement would probably be to still further increase the congestion of traffic at Temple Bar.

THE *Semaine des Constructeurs* (Jan. 10th) comments sarcastically on the bold project for erecting a colossal tower, in connexion with the forthcoming International Exhibition, of a height of 300 mètres (nearly twice that of Cologne spires). M. Bourdais is the architect responsible for the proposed scheme. *La Semaine* admits it to be a bold idea, but "l'audace coûte très cher," and our contemporary wants to know the advantage of it. There is to be an electric light on it to light all Paris; but considering that intensity of light diminishes as the square of the distance, one will be 900 times less lighted than by distributed lights placed at a height of 10 mètres, for example; besides "nos rues resteraient plongées dans la plus noire obscurité, tandis que les toits de nos maisons offriraient aux seuls habitants de ces parages, les chats, les promenades les plus vivement illuminées." M. Bourdais, however, is equal to the occasion, and proposes mirrors to direct the light to the places where it is wanted. So there is a new entertainment offered to visitors.

WE have received what may be called a pamphlet *de luxe*, under the title "Who Spoils our New English Books?" a question asked and answered in a paper read at a meeting of the Library Association at Cambridge, in 1882, by Mr. Henry Stevens, among whose various titles, arranged in wedge-form on the title-page, are included "Citizen of Noviomagius," and member of "Blackballed Athenæum Club." Mr. Stevens is of the opinion (which we do not contest) that the art of printing, binding, and generally getting up books in the best manner, is wofully decaying in England, and enumerates ten different classes of sinners (for list, see the book *), the Purchaser or Consumer, in his ignorance and indifference, being the greatest. We were wondering the other day how a poet like Lord Tennyson could consent to let his latest drama come out in a uniform harsh green, repellent to the eye, and of a texture equally disagreeable to the touch. For works of the higher order of literature, no doubt, it is supposed that simplicity in binding is in the best taste, —the value lying in the contents; but then there is all the difference between a noble and an ignoble simplicity. Mr. Stevens's booklet, we presume, is meant as an example how to get books up. The type and paper are admirable; the page shows a wide margin on the bottom and outside edges, which is really in accordance with practical considerations, since it is by those edges that we turn the pages; but it is a little overdone; the print seems rather squeezed into a corner. But is it an element in the best way of producing books, to leave the pages un-numbered? The reader will not thank the Noviomagian for that. Among a number of miscellaneous tags of quotations referring to books and the book-trade, with which the title-page and fly-leaves are garnished, occurs the following brief but comprehensive criticism extracted from the New Testament—"Whom Satan hath bound."

A New Air-heater.—At the meeting of the Royal Scottish Society of Arts, on Monday night, Mr. James Gowans, Vice-president, in the chair, Dr. W. G. Black exhibited and explained the action of an air-heater, contrived by himself, for warming the air of rooms. The apparatus consists of a chamber of sheet-iron, so constructed that it can be fitted on the top of a stove. Air, allowed to enter it by one pipe, is heated in passing through, and discharged by another pipe of the same dimensions, in such a way that it will ascend towards the ceiling, and thence descend gradually and diffuse itself through the apartment. This method, Dr. Black submitted, did not involve any admixture of smoke with the heated air; it dried the air during the time it was in the chamber, and it would have a sanitary effect in destroying organic germs. Some discussion followed, in which Dr. Macadam said he did not see that the apparatus could provide for the ventilation of a room; but as far as the heating of the air was concerned, he had no doubt it would have that effect. Mr. Sang then submitted "An elementary view of the strains on the Forth Bridge due to the shifting load."

* Published by H. N. Stevens, St. Martin's-lane.

ROYAL ACADEMY OF ARTS.

EXHIBITION OF WORKS BY THE OLD MASTERS: SIXTEENTH YEAR.

IF the present exhibition is not marked by the appearance of any picture of absolutely the highest rank of merit, it at all events possesses a large number of works of more than average interest and value. We shall take the somewhat unusual course of commencing with works of the English school. This winter, in the annals of English art, belongs especially to Gainsborough. The artist has now been dead for a great many decades, and we are enabled to form a better estimate of his value by the perspective of distance. The Grosvenor Gallery presents us with the materials for tracing the growth and compass of his powers, but the finest of his larger works has to be sought in the rooms of the Academy. It is the extensive canvas (195) bearing the full-length portraits of Squire Hilliard and his wife, painted in the last ten years of the artist's life. The youthful and handsome pair are walking gracefully and leisurely along arm in arm. Their attention has just been attracted to some moderately-distant object. The dog by their side, as with all Gainsborough's dogs, is an expectant animal, full of affection for his master. The lady is, indeed, rather a nymph than a woman of flesh and blood, but the squire is completely human. The three-quarter length portrait of Mrs. Hibbert is not less excellent in the skilful arrangement and selection of drapery; it is a picture of the same type as the portrait of Mrs. Basset (59 at the Grosvenor). Of other Gainsborough's, the portraits of two brides, Ladies Erne and Dillon, painted seated together, exemplify the style of a somewhat earlier period (*circa* 1776) of the artist's career, whilst the bust portrait of Lady Mulgrave (47) once more represents his advanced powers.

Reynolds is again brought before us in numerous beautiful works, no less, indeed, than twenty-four, none of which appeared at the Grosvenor last year. Of these the fascinating portrait of little Penelope Boothby (55) is known to every one through the medium of engravings. The self-portrait of the artist, holding his hand to his ear (39) and wearing the bright, yet conscious expression that plainly tells of deafness, is to us a more satisfactory picture than the better-known one with the ear-trumpet. Here the face stands out of a warm surrounding darkness with remarkable brilliancy and animation. The full-lengths of John Musters (189) and his wife (198) are likewise splendid examples of the master's style. The husband is simply and effectively presented, standing in an open landscape, before a mottled sky. The beholder's eye is at a low level, and the figure rises before him in a striking fashion. A great part of the picture is clearly the work of assistants, but the head has been carefully finished by Sir Joshua's own hand. There are two other portraits of Mrs. Musters in the collection, one (143) a half-length, likewise by Sir Joshua, the other (25), a bust, by Romney. A comparison between all three is interesting.

There are in all eight of Romney's pictures shown. Undoubtedly the best is the full-length of Lady Brooke (102) in the long room. In certain not altogether pleasant qualities of colour, in the long rhythmically-flowing curves of the dress, and still more in the presentation of character, this is one of Romney's most characteristic works. The brightness of the face and the excellent rendering of the rich hair are examples of the painter's special gifts.

Strictly speaking, we ought to have mentioned Hogarth before the inseparable triad, but as an artist he stands so much alone that we take him at any time and in any sequence. In few of the Old Masters Exhibitions has he been so well represented as here. Five of his works are before us, and amongst them some of his best. First comes the strong and solid, rather than attractive, portrait (6) of James Quin, the actor. The face looks forth with a certain dignity out of the nebulous importance of a full-bottomed wig. More generally pleasing is the group of little figures in a room, entitled "A Conversation at Wanstead House" (28). The persons represented are the first Lord Tylney and "many of his vassals and dependents." The picture contains high artistic qualities of light and colour, about which, owing to the badness of illumination at the time, we are unable to say more. The faces are in many instances bright and expressive, and, though the grouping is formal, the result is good. The background of the room is dark; the faces stand out from it in full light, handled with much skill. Two of the series of pictures entitled the "Four Times of the Day" put in a welcome appearance. Unfortunately, the owner of the companion pair could not be persuaded to gratify the public with a sight of them. The two shown, "Morning" (44) and "Night" (48), make us additionally anxious to behold the others. Both represent scenes in London, treated in the fearlessly satirical vein of the artist. Both are full of vigorous treatment, of strong delineations of character, and of that apparently accidental juxtaposition of incidents out of which the moral of the work arises. The "Southwark Fair" (144) is a larger picture, of a character almost Shakspearian. To treat, however, any of these pictures with justice would require more pages than we have lines to spare. Of the other great English artist, J. M. W. Turner, there are four examples. The "Burning of the Houses of Parliament" (197) is the most striking of them. It stands forth like a flaring incarnation of rage. On the one hand rises an indignant cloud of flame, with the Abbey towers seen like hot iron through the midst; on the other is the long stretch of bridge lighted up by the fire, with a multitude of folk, just visible if you fix your gaze on them, though the light dazzles so much that you can hardly see anything else but it. Laurence, Stothard, Constable, and many other English painters are more or less well represented, but we cannot now pause over their work. "The Boulogne Fish Market" (3) is a good Bonington.

It was from the Low Country painters of the seventeenth century that English art derived its chief impulse. It is not without fitness, therefore, that at these annual exhibitions the second room is always reserved for them. It contains a small but bold sketch by Rubens of St. Peter and St. Paul (78), standing each in an archway. It is a design either for stained glass or for a wall-decoration, one would suppose, but whether it was ever carried out we cannot say. The finest Rubenses occupy the position of honour in the long room. They are three important works from the Blenheim collection, possibly now making their last public appearance in England. The best of the three is certainly the portrait of Anne of Austria (147). She is seen as a seated three-quarter figure, in a black dress, with a large white ruff. The white complexion, for which she was famed, and the too much rouge she used to wear, are both shown by the painter, who has likewise treated with evident delight the arms and hands, of which it was said that all Europe knew the fame. The "Venus and Adonis" (146) manifests much of the artist's power and some of his weaknesses. The colour is unsatisfactory. The head of Venus is of extraordinary beauty, tender and fair, and her hair is splendid for quantity and glossy flow. She sits in a shady place under the trees, and would gladly restrain her lover, but the youth will away after his dogs, though baby Cupid hug his leg never so hard. The "Lot and his Daughters" (148) is much less attractive. The composition is poor, and of the heads only those of Lot and his wife are fine. She is weeping and miserable, just passing by a suggestive pillar.

Of Vandyck there is one very fine work, which throws the other three into the shade. It is the full-length portrait of Strafford in armour (188). Here we feel that the man himself stands before us, the strong governor, the relentless politician. In his face is a mastiff-like strength; the *pose* of his figure marks unhesitating decision of character. The "Buckingham Family" (145) from Blenheim is likewise a fine work, full of the "gloss of satin and glimmer of pearl." The equestrian portrait of Charles I. (183) is a school picture, if we mistake not, designed undoubtedly by the master. The slaty tones of the horse were never laid by Vandyck's brush.

There are many very excellent examples of the Dutch painters of the seventeenth century. To begin with Franz Hals, Lord Braybrooke's "Fiddler" (94) is a work which neither requires signature nor date (1630) to attest its genuineness. The same may be said of the "Dutch Lady," painted five years later. Both are examples in their different way of the grip the artist had of his subject and the forcibleness of his expression. Mr. Huish's "Conversation Piece" by Dirk Hals (136, dated 1614) is a beautiful piece of colour, the dresses of the two ladies on the left forming together a very pleasing passage. At first sight this set of long-legged folk almost seem like a joke of the artist's; but the length of limb is found on examination to be apparent rather than real, and is the result of the sartorial fashion of the time. Van Goyen has been better represented on other occasions than in the three pictures now brought together. Solomon Ruysdael, on the contrary, could scarcely be seen to better advantage. Most important for size and of excellent quality is the "River Scene" (152). A dark clump of trees in the midst of the shadowed foreground renders the light behind all the more luminous, whilst the cloud-drift across the sky gives the distance an animation which in the foreground is effected by the presence of one of the artist's favourite ferry-boats. The large Albert Cuyp (101) is a conventional and indifferent work. More satisfactory is the "Landscape with Cows" (93), which breathes the quiet sentiment of evening and approaching rest. The little "Sultry Morning on the Maas" (107) is, perhaps, the best of all. One canvas only claims to have felt the touch of Rembrandt. The subject, "Tobit and the Angel" (135), is undoubtedly treated in his style, but the faces seem to want that fire of feeling which he never failed to infuse into them. A picture by Solomon Koning (82, dated 1635) is an early example of that artist under Rembrandt's influence. It is called "A Merchant," and the catalogue states that the table is covered with "papers and documents." In reality it represents an author writing, and the huge tomes spread out before him are monuments of stored learning and not musty account-books. "An Old Woman" (137), by G. van den Eeckhout, is a poor work inspired by the same great master. We cannot expect every year to see such a magnificent Terburg as that which delighted us last winter. The "Lady at her Toilet" (121), though not in such perfect preservation as the "Letter," is, nevertheless, a fine work. It manifests the painter's faultless understanding of the use of colour,—what it can do and what it cannot,—and, as a piece of workmanship, is as fine as anything can be. The Queen's Metzu, "Le Corset Bleu" (109), is a picture possessing similar qualities and worthy of the closest examination. The so-called "Water Doctor" (76) is quite up to the average of Gerard Dow, the lights being handled with much skill, and the accessories, brass things and books, being of course finely finished and well chosen for harmony of colour. Aart van der Neer is only too unpleasantly prominent; none of his exhibited works, except the "River Scene in Guelderland" (108), being possessed of charm. The exception, however, is a work of merit. Jan van de Capelle's "Calm" (117) is of his usual style. In former years, however, we have been shown works which throw this into the shade. Paul Potter's "Sportsmen" (119), though a small picture, is one of the painter's best works; the figures on horse and foot are well grouped together; the whole is good in light and colour, and well worked out. Of Jan Steen's works we have had a more attractive display than those shown this year. All of them are unpleasant in colour and some in subject, though in none is the artist anything but himself, individual and original as he always was. "The Mouth of a River" (141), by William van de Velde, is a pleasant little piece, worth comparing with one or two other treatments of a similar subject by different artists in the same room.

The fifteenth and early sixteenth century schools of Northern Europe are not numerously represented this year. The earliest picture is a "Marriage of the Virgin" (215), foolishly ascribed to Van Eyck, but in reality a Cologne work of about 1480. This is followed, in point of time, by the most important work in the Exhibition, the famous "Adoration of the Magi," by Mabuse, from Castle Howard (230). Mabuse was an artist of the School of Bruges, who, up to nearly the fortieth year of his life, was subject only to Flemish influences. This picture represents him at the height of his native power, and before that power had been corrupted by the pernicious influence of Italy. Had he but stayed at home and gone on painting in this fashion, gathering increase of experience and dexterity, the last twenty years of his life might have produced as rich a harvest of mature work as Dürer himself gave forth. The fates determined otherwise. For perfection of finish, definite knowledge of what to do

and how to do it, few pictures in the world surpass this extraordinary work.

The styles of Bernard van Orley and Mostaert appear in two pictures, a lady's portrait (153), ascribed to the former, and a "Magdalen" (202) by the latter. Of sixteenth-century German artists there are a few works of the second rank. Two wings of some altar-piece (219 and 221), ascribed to a certain Hans Braun, unknown to us, are in reality good specimens of the style of Bartholomeus de Bruyn. From the Dublin National Gallery come two South German portraits, that of Margaret Knoblauchin (174) by a Swiss follower of Holbein, and that of Anthony Hundertpfundt (175), by Wolfgang Hauber, a conscientious imitator of Dürer.

Coming now to Italian pictures, there are none of great merit belonging to the early schools. The North Italians are best represented. First comes an unpleasant, but seemingly genuine, work of Bartolomeo Vivarini (206), painted under Paduan influence. The "Madonna" (207) is a signed picture by a rare pupil of Bellini, Giovanni Mansueti. The "Madonna with Saints" (211) is an early work by some other pupil of Bellini's, just possibly Cima. "Diana and the Fishermen" (205) and the "Battle Piece" (253) are both good pictures, and show the influence, though not the handiwork, of Giorgione. Far less excellent is the "Three Kings" (227), falsely ascribed to Catena. It is by some Germanising Venetian of small importance. The "Punishment of Actæon" (159) is rightly ascribed to Veronese, though at first glance it more resembles a painting by Tintoret. It contains no splendour of drapery and no elaborate architecture. The charm of it is the play of light upon the nude, which is inspired by Tintoret, and the rare harmony of colour, which is Veronese's own. The other picture ascribed to the same artist (168) is a poor school work. An animated representation of the "Piazza Coleone" (154) is a really good example of the powers of Francesco Guardi.

The front of a *cassone* (218) is a rare piece of work, probably from the studio of Vittore Pisano. The "St. Catherine" (216) is one of Crivelli's most pleasing productions, full of tender sentiment and graceful design. It is in perfect preservation. The bust portrait in profile (209) is rightly given to Ambrogio Borgognone. It shows him under the influence of Antonello, and is one of the best specimens of his work. Very close to him are the panels forming a further instalment of the decorative frieze belonging to Mr. Willett, some of which were shown last year. They are exceedingly interesting, and quite up to the average of what we saw before. The "Madonna" (222) is of the ordinary Milanese type.

The "Holy Family" (173) comes from the period, though not the hand, of Marco d'Oggione. The so-called Bottinone (228) is likewise a Milanese painting with strong Florentine elements, and treated in an archaistic manner. A good and well-conserved example of Francia appears in the "S. Roch" (176), which is both signed and dated (1502).

Some interesting Florentine pictures are placed in the Fourth Gallery. None of the works of the school of Giotto are of any importance. The little "Journey of the Three Kings" (220) shows the combined influences of Angelico and G. da Fabriano. An "Allegory" (254), ascribed to Signorelli, is probably by Piero di Cosimo, who had a liking for such subjects; by no possibility is it a Signorelli. The lunette (235) is by Botticelli, and thoroughly characteristic of his early period. The round "Madonna" (244) is a school work. The eighteen little pilaster panels bearing saints (252, 256) are good school pictures from a master's design. There is a very simple and beautiful "Madonna," by Albertinelli (225), and four little paintings (213) are likewise ascribed to him. A half-length "St. George" (208) is only of Ghirlandaio's school. The little round "Madonna and Saints" (203), ascribed to Raffaelino del Garbo, is at least a most charming work of the late fifteenth-century Florentine school. The *cassone* front (212) and the "Entombment" (217) are poor anonymous works of the same period, showing Botticelli's influence. There are several anonymous fifteenth-century Sienese pictures (232, 243, 251), and one, a "Madonna" (210), with which the name of Matteo da Siena is in all probability justly associated.

The authorship of the picture of a "Choirmaster" (180) is a problem to the solution of which we can offer no help. The work is certainly fine, probably Italian, and painted in the last part of the sixteenth century.

The best Spanish picture is a "Madonna in Glory" (164), by Murillo, of his usual kind, though better than usual in treatment. We prefer it above the famous but vulgar work in the Louvre. The so-called "Portrait of a Genoese Noble" (150), really a picture of a Man-at-arms, is a thoroughly sound and effective piece of workmanship. Velasquez's hand had no share in the painting of the "Head of a Man" (181), though his influence is apparent throughout it. Zurbaran is accredited with the unattractive "Franciscan Friar" (162).

The "Assumption" (172) is a genuine piece of Nicholas Poussin's work. The definiteness of the artist's intention, and the easy skill by which he attains his ends, are the good points in a picture which is not likely to be popular in these days. Two "Fêtes Champêtres" (115 and 128) are good examples of what was possible to Jean Baptiste Pater, one of the best followers of Watteau.

THE LATE MR. JOHN WHICHCORD.

IT is with great regret that we record the death of Mr. John Whichcord, F.S.A., architect, and past-President of the Royal Institute of British Architects. He died at his residence, 23, Inverness-terrace, on the 9th inst., after a short illness, the cause of death being inflammation of the lungs, terminating with paralysis of the heart.

Mr. Whichcord was born on Nov. 11, 1823, so that he had but recently entered on his sixty-second year. His native place was Maidstone, where his father (who died in 1860) carried on a large practice, besides holding the position of County Surveyor. The future President of the Institute was educated at Maidstone, and afterwards at King's College, London, under Dr. Lonsdale. He commenced his professional work as his father's pupil in January, 1840, and became a student at the Royal Academy in 1844. In the same year he was elected an Associate of the Institute. In these early years of his professional life he assisted in the erection of public buildings in Canterbury, Maidstone, Rochester, and other towns. He also made surveys for railways intersecting the county of Kent, and took part in the construction of locks, bridges, and other hydraulic works on the River Medway. He went abroad in 1846, passing through France to Italy, and proceeding to the Ionian Islands, Greece, and Turkey. Having got so far, it is not to be wondered at that he was seized with a strong inclination to visit Syria and the Holy Land. He travelled for a lengthened period in Turkey in Asia as an Arab, living with a tribe, and making a journey to the Euphrates. Returning to Syria, he made a visit to every known spot mentioned in the life of our Saviour. Having acquired the language and assumed the costume of their custodians, he was enabled to visit the Mahometan holy places and mosques without hindrance. Departing from Syria, he went into Egypt, proceeding as far up the Nile as the Third Cataract. He returned to Europe in the early part of the year 1850, but went abroad again the same year for a shorter tour in France, Italy, Germany, and Denmark. As may be supposed, he made a large number of sketches while on his travels. On his return he entered into partnership with the late Mr. Arthur Ashpitel, in conjunction with whom he carried out several important works, of an engineering as well as of an architectural character, not only in England, but in Italy, France, and Germany. This partnership was terminated in 1858, and Mr. Ashpitel died in 1869. In 1854 (a year before the Metropolitan Board of Works was created) he was appointed by the magistrates District Surveyor for Deptford. He was elected a Fellow of the Institute in 1850, and President in 1879, holding office for two years. Mr. Whichcord's work as President of the Institute was characterised by his usual energy and business capacity; and whatever differences of opinion may be entertained as to the policy continued under his *régime*, those who differed most from that policy will be the first to admit that in his guidance of the affairs of the Institute he was actuated by an earnest desire to promote the welfare of architects and the prosperity of architecture. It was mainly due to his efforts that the Obligatory Examination was put on an effective footing. He was an admirable chairman, displaying great tact, and always keeping a meeting over which he presided well in hand. He was elected President of the Architects' Benevolent Society in 1881, in succession to Mr. T. H. Wyatt. He held the appointment of consulting architect to the Colonial Government in respect of the new Houses of Parliament at Cape Town, and designed the internal fittings of those buildings. He was one of the surveyors to the Railway Department of the Board of Trade. The principal buildings with which his name is associated as architect are St. Stephen's Club House, Westminster,* the National Safe Deposit Company's building, and the New Zealand Banking House, Queen Victoria-street, besides numerous buildings for mercantile purposes in the City of London, including the large block of offices known as No. 9, Mincing-lane; No. 24, Lombard-street; No. 8, Old Jewry; Mansion House Chambers, Queen Victoria-street; and Messrs. Brown, Janson, & Co.'s Banking House, Abchurch-lane. He was architect of the Grand Hotel at Brighton, the Clarence Hotel, Dover, and other buildings of the kind. He was also architect of St. Mary's Church and parsonage, Shortlands, Kent. Of recent years Mr. Whichcord has been largely occupied as arbitrator in reference and compensation cases, being frequently employed in those matters by the Government, the Metropolitan Board of Works, and railway companies. He was the author of "The History and Antiquities of Christ Church, Maidstone," "The History and Antiquities of St. Mary's, Aldermanbury," "Polychromy of the Middle Ages," besides several other works. He contributed many valuable papers to the Transactions of the Royal Institute of British Architects. In conjunction with his partner, the late Mr. Arthur Ashpitel, he published a work entitled "Observations on Baths and Wash-houses,"† also a companion work on the "Erection of Fireproof Houses in Flats." He was a Fellow of the Society of Antiquaries (elected in 1848) and a member of the Institution of Surveyors.

Mr. Whichcord was, in 1865, a candidate for the representation of Barnstaple in Parliament. He contested the borough on Conservative principles, but unsuccessfully. He took an active interest in the Volunter movement, and in 1869 became a captain in the 1st Middlesex Artillery Volunteers, having previously served in the Kent Yeomanry. For the first-mentioned corps he, in conjunction with Sir John Monckton, raised a battery mainly composed of young architects and lawyers. He took an active part in Freemasonry, having been initiated into the "Jerusalem" Lodge in 1845.

Mr. Whichcord was twice married. By his first wife (an Italian lady) he had no issue. By his second wife (whom he married in 1860, and who survives him) he had a family of seven children, five of whom are living.

The funeral took place on Thursday last at Kensal Green Cemetery, and was attended by the President and several members of the Council of the Royal Institute of British Architects, besides deputations from the District Surveyors' Association, the Surveyors' Institution, the Surveyors' Association, the Institution of Civil Engineers, and the "Jerusalem" Lodge. Amongst those present were the following:—Sir John Monckton, Sir Charles Hutton Gregory, C.E., K.C.M.G.; Major Davies; and Messrs. Ewan Christian, E. R. Robson, J. Macvicar Anderson, W. H. White, Thomas Chatfeild Clarke, Octavius Hansard, Alfred Conder, J. Tavenor Perry, Henry Currey, Joseph Clarke, Arthur Cates, Professor Hayter Lewis, Benjamin Tabberer, John Clarkson, Banister Fletcher, Robert Walker, William Cunningham Glen, C. L. Eastlake, and Cole A. Adams, President of the Architectural Association.

The Builders' Ball.—The thirty-seventh annual ball in aid of the funds of the Builders' Benevolent Institution is to take place at Willis's Rooms, King-street, St. James's, on Thursday next, the 22nd inst.

* For illustrations and description see *Builder*, vol. xxxii. (1874), pp. 308, 309, 311.

† In conjunction with the same gentleman, Mr. Whichcord was architect of the Lambeth Baths, Westminster Bridge-road, one of the earliest and largest establishments of its kind in London.

Illustrations.

WINDOW IN SOUTH CHOIR AISLE, SALISBURY.

WE give this week two more of Mr. Burne Jones's figures from a window in the south choir aisle, Salisbury Cathedral. Two figures from the same window were illustrated in the *Builder* for January 3rd.

ALL SAINTS' CHURCH, UPPER HOLLOWAY.

THIS church, now being erected from the designs of Mr. J. E. K. Cutts, which were selected in a limited competition of five architects,—Mr. Ewan Christian being the professional referee,—consists of nave, chancel, aisles, organ-chamber, large west porch, and two large vestries. It is faced on the outside with red bricks, the interior being plastered with arches, quoins, jambs, and reveals of red brick. The stone of the pillars, tracery, &c., is Bath, from the Monks Quarry. The roofs and seats are of pitch pine, and the paving of the nave of wooden blocks. Messrs. Dove Bros. are the contractors, whose tender for the work complete was 4,975*l*. The church provides 708 sittings.

THE CHURCH OF ST. MARY, GEDDING, SUFFOLK.

THIS interesting and quaint little church, which lies in the immediate neighbourhood visited by the Architectural Association this year, is being restored under the supervision of Mr. E. F. Bisshopp, architect.

The general features are of Decorated character, though there are evidences of a much earlier date. Traces of the moat, which originally surrounded the church, are still distinctly perceptible.

After various patchwork repairs, executed during the dark age of the last two centuries, the building had fallen into a most deplorable condition, the nave being quite unfit for divine service. Upon being instituted to the living, the new rector, the Rev. J. Sidney Boucher, set most energetically to work on the restoration. This has been carried out strictly on the founder's lines, reverentially preserving every original feature, and substituting no modern paltriness for ancient solidity of construction. So that Gedding, with its Norman loop-holes, lepers' grating, triple chancel arch, &c., will amply maintain its character for being not only one of the oldest, but most interesting of churches in the kingdom.

The nave roof has been taken off, reframed, and refixed, all the sound old oak timber having been re-used. In hacking off the plaster which disfigured the outside face of the walls, two Norman windows were discovered, one on either side of the nave, north and south. These have been carefully opened up and glazed. The lepers' window in the chancel has been exposed to view, together with its original ironwork found therein. The triple chancel arch is being restored, some of the stonework having been removed and made good in brick. There are slight remains of the rood-screen, and the six ancient benches left will be refixed.

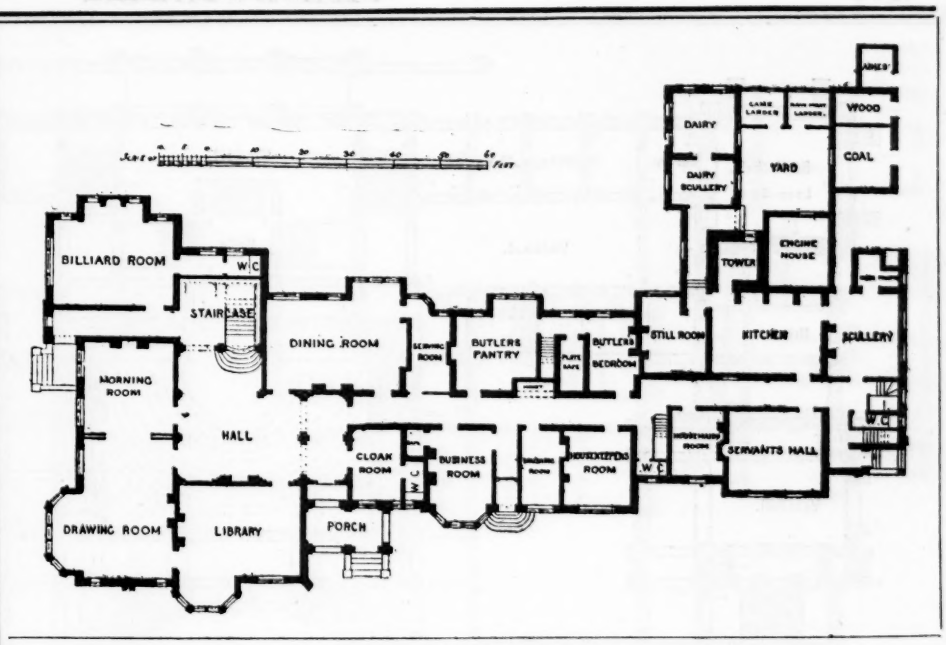
The upper part of the tower, if ever erected, has disappeared, and is now of brickwork, with a hipped tiled roof. The restoration of the tower and the porch, shown in the view to replace one in white brick, pulled down, is not included in the present contract.

The contractor is Mr. R. Tooley, of Ipswich.

HOUSE AT MATTHEW'S GREEN, WOKINGHAM.

THIS house, which has been erected from the designs and under the superintendence of Mr. Ravenscroft, of Reading, is situated in well-wooded and pleasantly-placed grounds near Wokingham.

It occupies the site of an older house, which not only was devoid of interest, but in such a condition that the enlargement of it first contemplated was found to be impracticable. The present house, with lodge, conservatory, &c., all designed to be in harmony, was carried out by Mr. Filewood, formerly of Reading, but now of the firm of Silver, Son, & Filewood, of Maidenhead, for the proprietor. The whole cost was about 7,000*l*.



Askham Hall, near York.—Ground Plan.

ASKHAM HALL.

THE new Hall is to replace an existing one, of no special interest, which was not convenient in arrangements or good in its sanitary conditions. The present building, which is in process of construction, is planned with all the advantages of our now extended knowledge of hygienic requirements. The whole structure is underlaid with a stratum of cement concrete; the drainage has arrangements for automatic flushing; and the methods of heating and ventilating the house are of a very complete character. The view and plan speak for themselves as to the designing and planning of the building. Externally no attempt has been made at elaboration of detail beyond what is necessary to emphasise the reception portion of the house. A certain picturesqueness of grouping has been sought for as suitable to the position which it occupies, embosomed in trees, and the dominant feature in the little village whose old-fashioned green and rural pond it overlooks. Internally the principal feature is the central hall, around which the reception-rooms are ranged. This portion of the dwelling is carried up two stories, is lighted by a domed ceiling, and is treated with some little amount of detail. The materials of which the hall is built are red bricks and tiles, with Bolton Wood stone dressings. The dwelling will be the country seat of Sir Andrew Fairbairn, Member for the Eastern Division of the county of York, and has been designed, and is being carried out, by Messrs. Chorley & Connon, architects, of 15, Park-row, Leeds.

IMPERIAL HOUSES OF PARLIAMENT, BERLIN:

PRIZE SCHEME FOR HEATING AND VENTILATION.

WE give here the plans of the system of heating apparatus and ventilation to which the prize was awarded during the past year in a competition for the best design. The scheme is by Mr. D. Grove, and the following is a translation of so much of his report as is requisite to render the scheme intelligible:—

"*Drawing-in of the Air.*—Besides the disposition of the openings for the entrance of fresh air in the walls of the slopes of the west front, the use of the fountain in the Königsplatz (see fig. 4) is proposed as a point for taking in the air. As the bottoms of the necessary channels should only be 1·8 mètre (about 5 ft. 10 in.) below the surface, the difficulty arises of constructing them large enough to pass the requisite quantity of air. By using the best wood-paving immediately over the vault of the channel, or over cast-iron pipes with an under-bedding of concrete, the depth of the construction of the channel covering can be limited from 25 to 15 centimètres (about 10 in. to 6 in.), so that the channel can have a clear height of 1·55 to 1·65 mètre (5 ft. to 5 ft. 4 in.). It remains desirable to raise the ground at this point as much as possible, or to lower the bottom of the basin. The uprising and misty stream of the fountain so lowers the temperature of the body of air over the basin that there results a rapid descending stream from the upper clean air strata to the lower; this takes the air into the openings arranged around the inner border of the basin. The sectional area of these may be taken as 33 square mètres (about 39½ square yards). The water flowing off is conducted to the ends of the channels by the slopes, there distributed in open shallow gutters of galvanised sheet iron, of which four in each of the twelve channels are arranged with slight falls back towards the fountain. The area of the water-surface amounts, with 40 mètres (about 151 ft.) length of channel, in the whole to 800 square mètres (about 956 square yards). If the water of the fountain, the quantity of which according to data amounts to 50 cubic mètres (about 1,766 cubic feet) per hour, experiences a warming in the whole of about 6° Centigrade (10·8° Fah.), it draws from the air per hour 300,000 units of warmth,* and thus effects for 250,000 cubic mètres (over 8,000,000 cubic feet), a moderation of the temperature of 4° Centigrade (7·2° Fah.). An alteration of the warmth by evaporation is not to be calculated on, as the thawing point under circumstances is higher than the temperature of the water. With a *strong and ensured* change of air, a *very* considerable lowering of the temperature in summer is *not* requisite; but for times of *particularly great heat* the arrangement is so contrived that the coils of pipes in the air-collecting room, serving during the winter as heating bodies, can be connected with a cold-water supply according to the system of Linde, with a freezing-machine in the boiler-house. These pipes have a diameter of 50 millimètres (nearly 2 in.), and an outer surface of 3,360 square mètres in area (about 4,018 square yards).

Purifying of the Air.—By utilising the whole height of the cellar and basement stories for the collecting-room for the air under the hall of the west front, a moderating of the speed of the air stream to 0·6 m. (about 2 ft.) per second is aimed at, and room is gained for abundant filter surfaces, 300 square mètres (about 359 sq. yds.). The filters are wooden frames spanned with porous stuffs specially manufactured for the purpose, and can be removed for purposes of cleaning. The dust is already partly beaten down by the water spray before reaching the filters.

Tempering of the Air.—The groups of heating pipes behind the filters serve for raising the warmth of the air 12° Cent. (21·6° Fahr.), These can be shut off singly, are far reaching, arranged at all places for easy access, and contain the necessary heating surface to deliver the amount of warmth requisite for moistening it. Vertical and movable door-valves make possible the conducting and regulating of the streams of the colder and warmer air strata.

Moistening of the Air.—The air thus raised 12° Cent. is nearly completely saturated with

* Translator's note. The unit of warmth, according to the German standard, is the amount transmitted in one hour per cubic mètre (10·754 square feet) through a body with parallel surfaces.

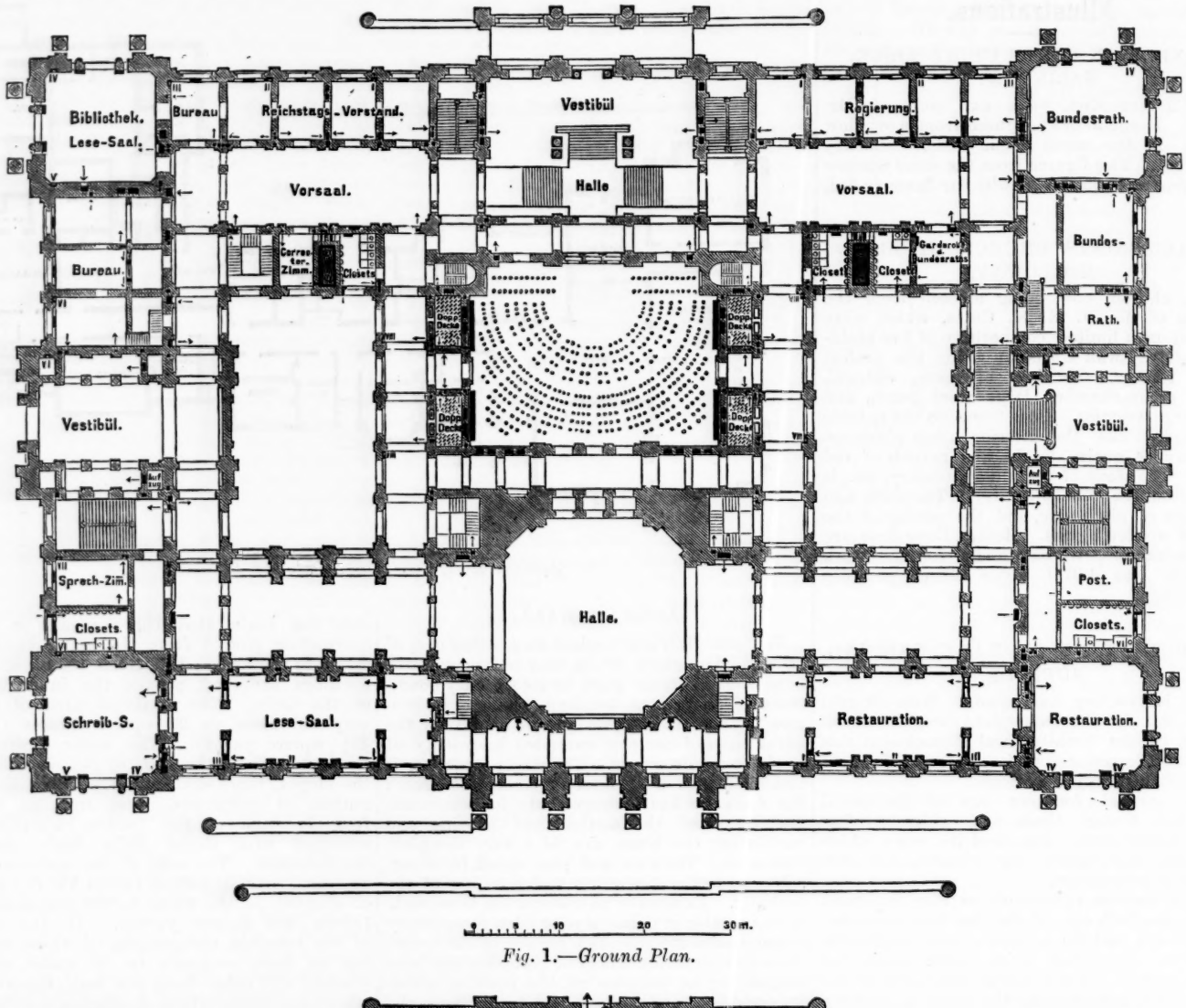


Fig. 1.—*Ground Plan.*

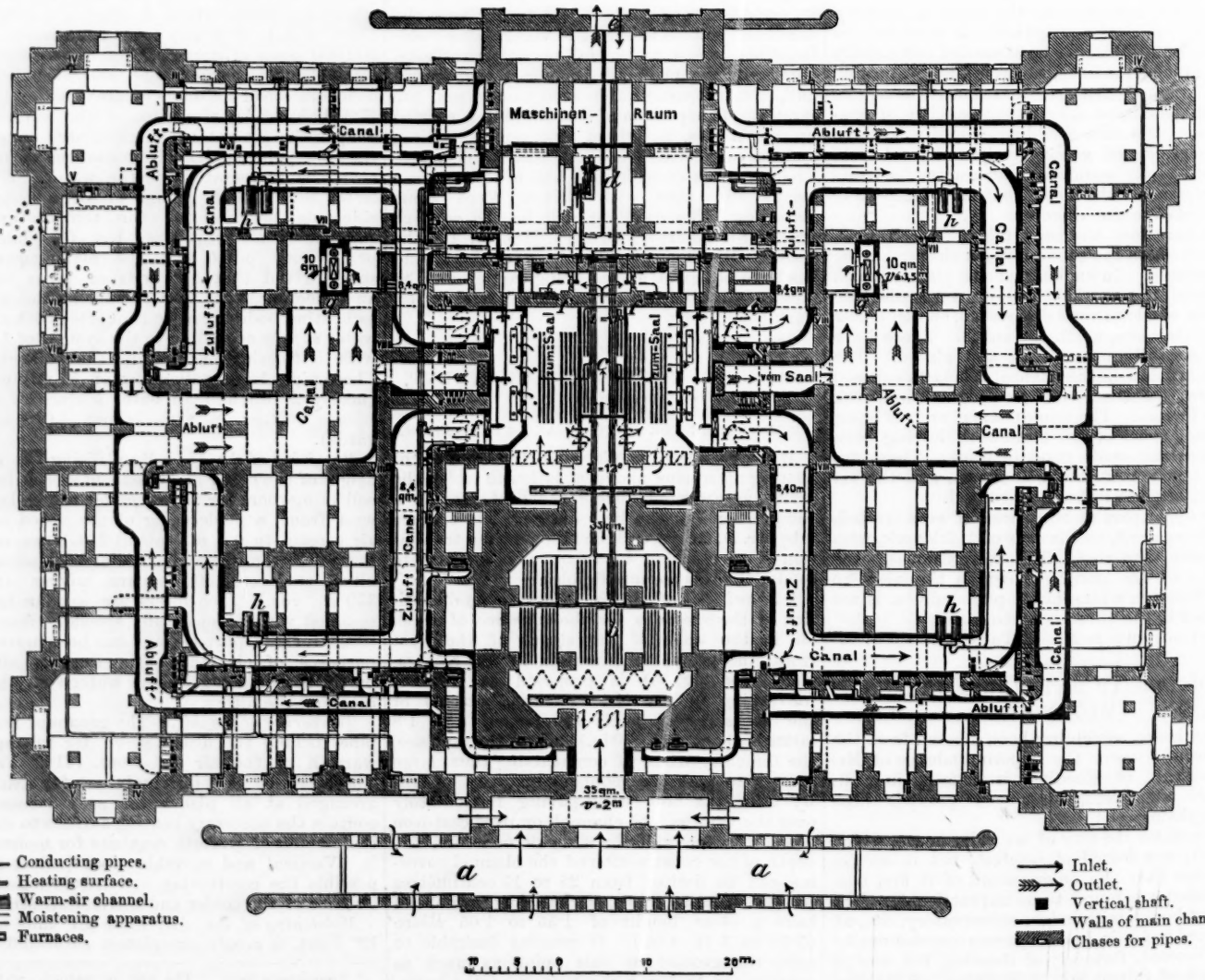


Fig. 2.—*Basement Plan.*

IMPERIAL HOUSES OF PARLIAMENT, BERLIN: PRIZE SCHEME FOR HEATING AND VENTILATION.

MR. D. GROVE, ENGINEER.

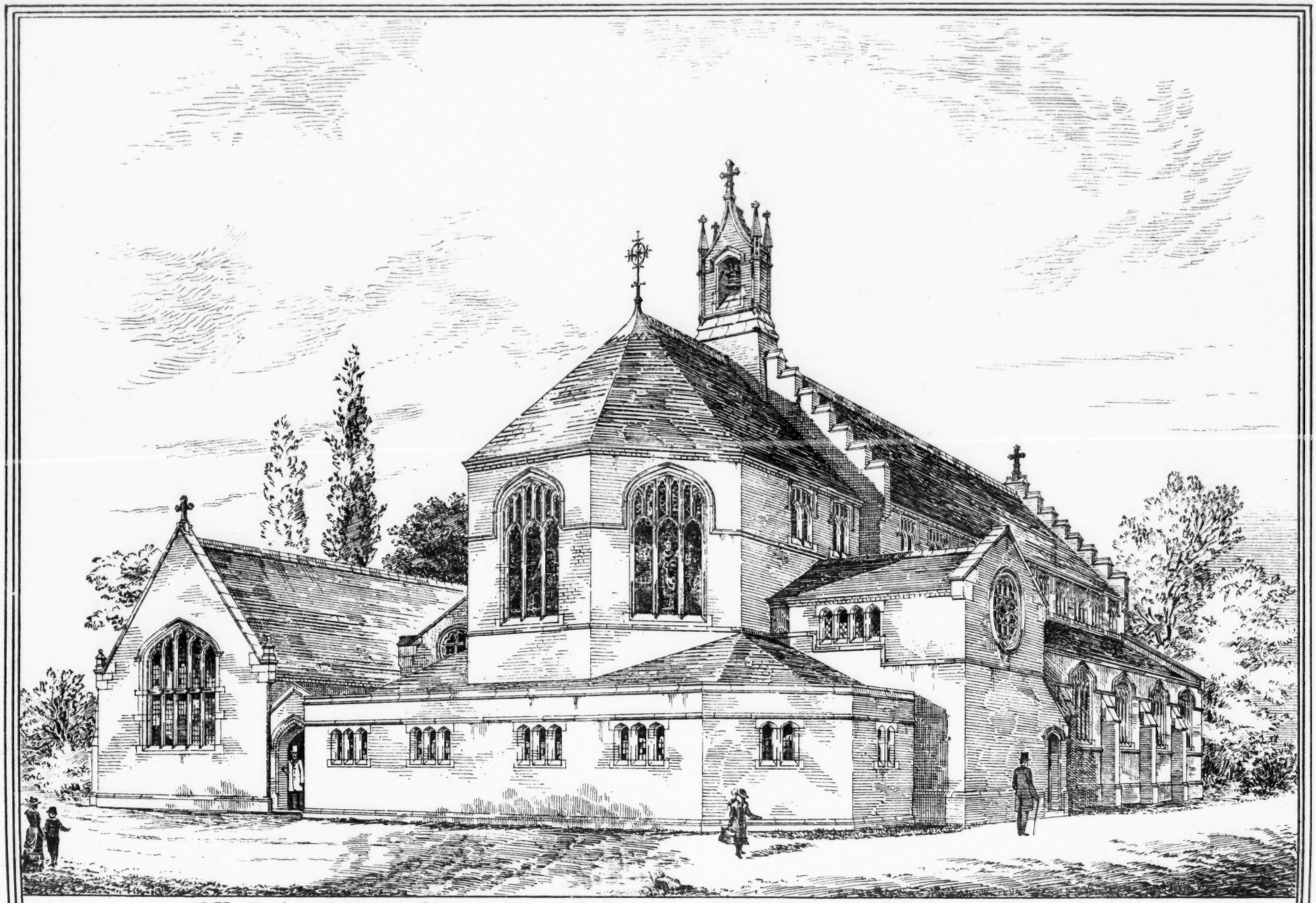
angeli:administrantes

"INK-PHOTO", SPRAGUE & Cº. LONDON.

FROM A WINDOW IN THE SOUTH CHOIR AISLE, SALISBURY CATHEDRAL.

DESIGNED BY MR. E. BURNE-JONES.
EXECUTED BY WM. MORRIS & CO.

N.B.—For two other figures from the same window see "Builder," January 3rd, 1885.



All Saints' Church and Parish Room, UPPER-HOLLOWAY

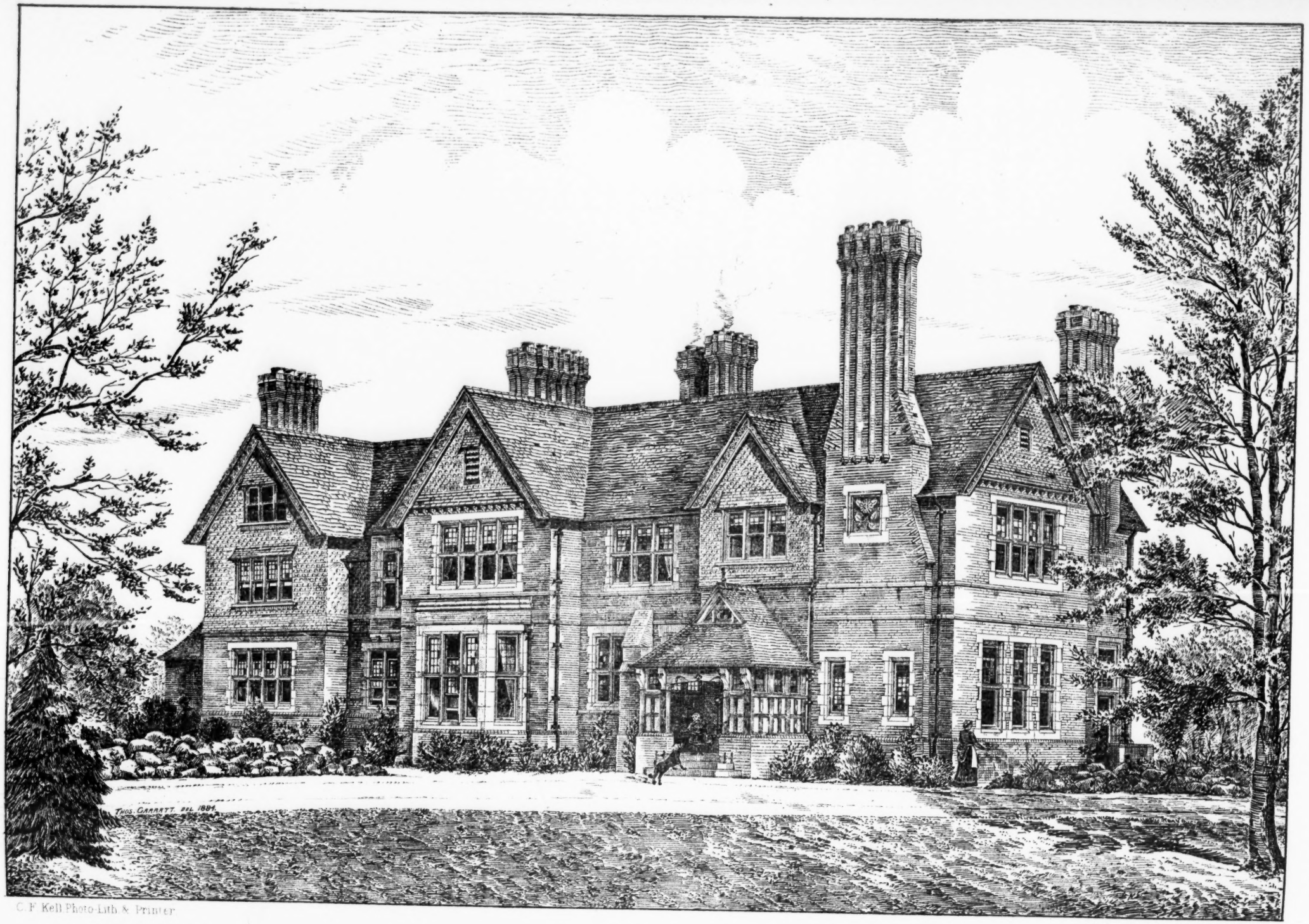
Wyman & Sons, Photo Litho C^t Queen S^t London W.C.

MR. J. E. K. CUTTS, ARCHITECT.

Wyman & Sons, Photo-Litho

C° Queen St London W.C.

ST. MARY'S, GEDDING, SUFFOLK: RESTORATION.—Mr. E. F. Bisshopp, Architect.



C. F. Kell Photo-Lith & Printer 8 Castle St Holborn London E.C.

HOUSE AT WOKINGHAM, MR. W. RAVENSCROFT, ARCHITECT.

ASKHAM HALL. Nr YORK.
FOR SIR ANDREW FAIRBAIRN. M.P.
Messrs CHORLEY & CONNON. ARCHITECTS, 15, Park Row, Leeds.

C.F. Kell Photo-Lith & Printer.

8, Castle St Holborn, London E.C.

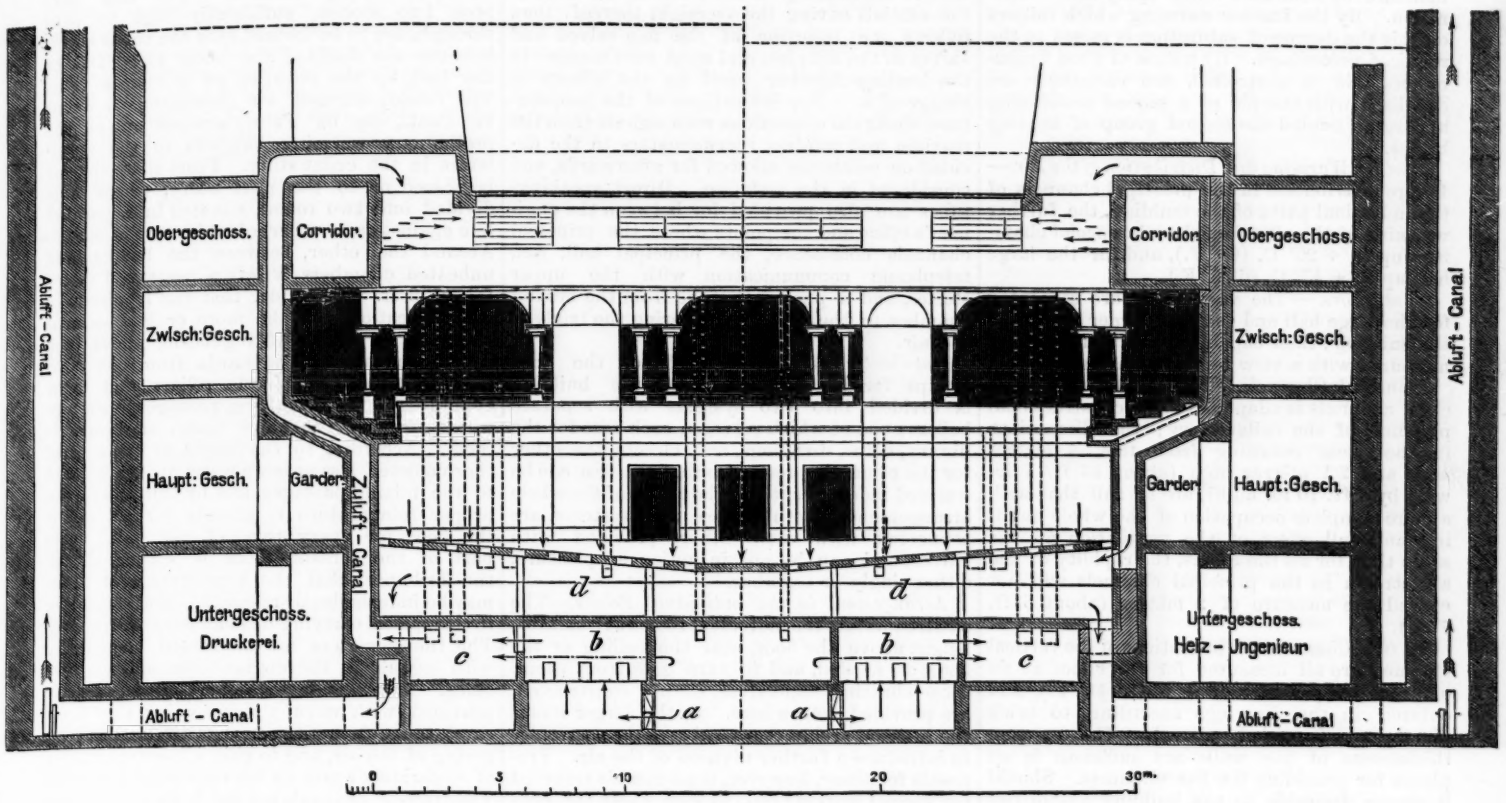


Fig. 3.—Section of Centre Portion.

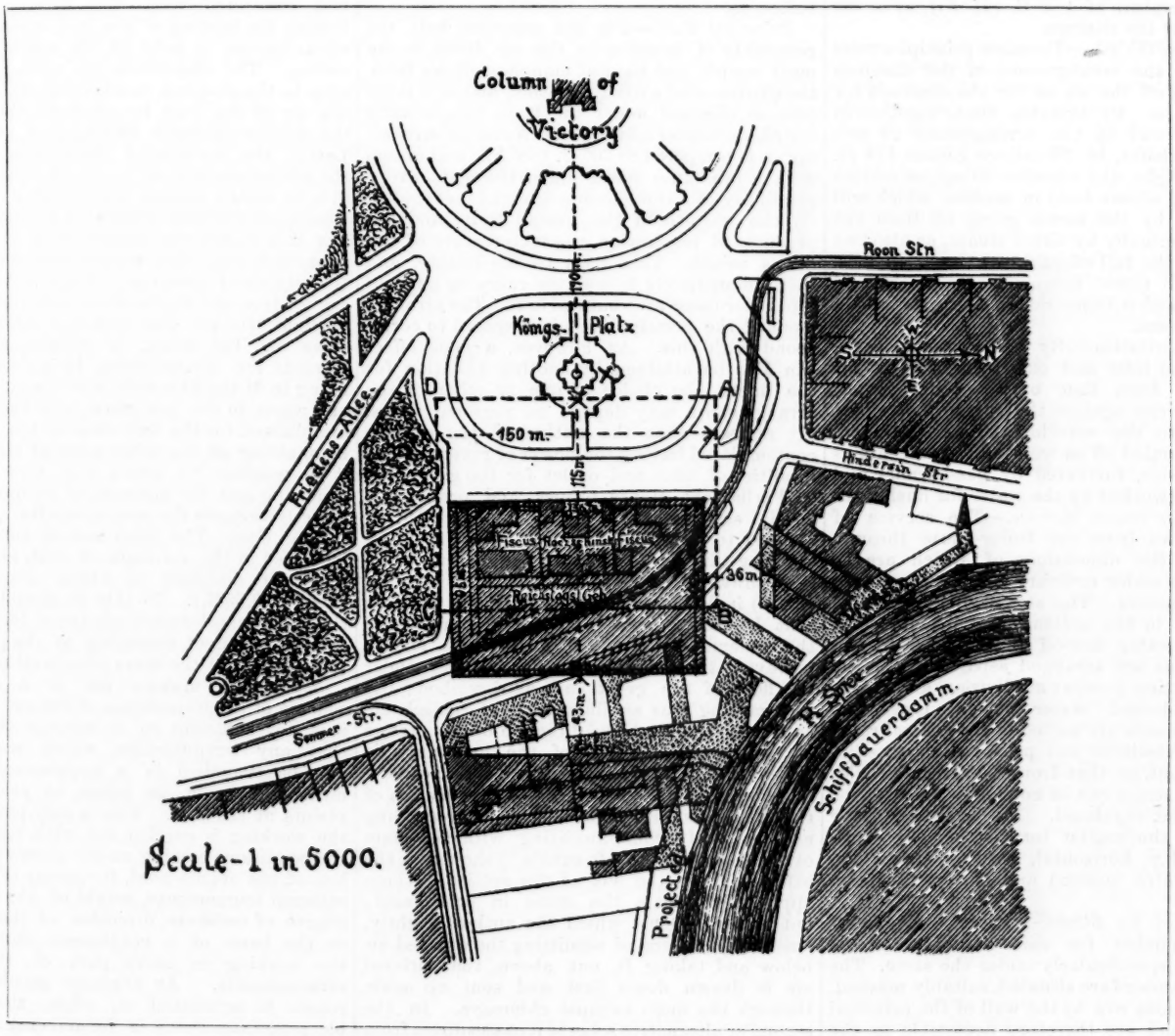


Fig. 4.—Site of the Future Reichstags-gebäude, with immediate Surrounding.

NOTE.—The shaded surface as shown marks the definite site of the Reichstags-gebäude; that with dotted outline, marked with the letters A B C D, the site for the competition of 1872. The letter X marks the fountain proposed to be utilised.

IMPERIAL HOUSES OF PARLIAMENT, BERLIN: PRIZE SCHEME FOR HEATING AND VENTILATION

MR. D. GROVE, ENGINEER.

moisture by abundant water spray and evaporation. By the further warming which follows on this the degree of saturation is raised to the required percentage. By means of fixed hygrometers this is controlled, and variations are equalised with the aid of a second moistening apparatus behind the second group of heating bodies.

Further Warming and Distribution of the Air.—Before distribution in the principal channels of the individual parts of the building, the further warming of the air takes place in special chambers up to + 20° C. (68° F.), and for the large hall up to + 17° C. (62·6° F.).

Ventilators.—The ventilators are separated for the large hall and the four corner groups of the building; their capability of action is strictly measured with a view to loss by pressure.

Principal Channels.—The size of the principal channels is adapted to the constructional planning of the cellar story; the dimensions in the clear resulting from this, 4 mètres wide and 2·1 mètres high (about 13 ft. 1 in. wide by 6 ft. 10 in. high), are so full that with a more complete occupation of the whole building and full effect of the ventilation at the same time for all the rooms, the rapidity of the air stream in the principal channels will not exceed the measure of 2 mètres (about 6 ft. 7 in.).

Vertical Channels.—The sections of the vertical channels are all measured for full effect at an external temperature of + 5° C. (41° F.), and entered in the drawings according to brick dimensions (rounded above). The existing thicknesses of the walls are sufficient in all places for providing for the channels. Should it appear desirable to the building authorities to diminish certain of the sections, this is very easily possible in those rooms which do not require the full effect without propulsion at an outer temperature of + 5° C. (41° F.), as in the chambers for the sittings.

Carrying off the Air.—The same principles were suitable for the arrangement of the channels for carrying off the air as for the channels for bringing it in. By bringing these together in the cellars, and by the arrangement of two aspiration shafts, of 35 mètres (about 114 ft. 10 in.) in height, and together 20 square mètres (about 215½ square feet) in section, which will be warmed by the steam going off from the engines, eventually by direct steam, as also two exhausters, the full effect can be reached with safety at all times, independently of external influences, and without raising the pressure of air in the rooms.

Closet Ventilation.—By the complete separation of the inlet and outlet of the air for the closets from that of the other rooms, perfect security against the entrance of closet air, &c., into the corridors, &c., is attained. The air is carried off as well under the seats as at the ceilings, furthered by gas-burners and exhausters (worked by the water for flushing).

Engine for Steam Service.—The service of steam follows from the boiler-house through two pipes, the dimensions of which are so chosen that under ordinary circumstances one suffices for action. The steam-pipes are freed from water in the ordinary way by self-acting condensed water flow-off pipes. The to and from services are arranged separately for the distinct heating groups: all division and return valves, condensed water flow-off pipes and collecting vessels are united in the central room under the vestibule and principal staircase of the east front, so that from there the circulation of the steam can be conducted to all parts, shut off, and regulated. In the same place is situated the engine for driving the ventilators (50-h.p. horizontal, with Colman's distributing valve motion) and the main transmission.

Air heated by Steam.—There is a special heating-chamber for each individual room arranged perpendicularly under the same. The heating-chambers are situated, suitably marked, in a continuous row by the wall of the principal channels, and are therefore accessible in the easiest manner; the front wall is formed movable, the dimensions so measured that the medium speed of the stream in the same does not exceed 0·5 mètre (about 19½ in.).

Regulation of the Heating of the Air by Steam. The regulating valves are intended to be constructed in a most simple manner, close-shutting, balanced, with bronze framing and adjusting apparatus; the detail is reserved for special working out. The permissible maxima and minima of the temperature are signalled both in the heating-chamber and in the office of the officials having the oversight thereof; then follows the insertion of the flap-valves and valves in the simplest and most sure manner in the heating-chamber itself by the officers in charge of it. For indications of the temperature, electrical connexions with signals from the maxima and minima thermometers to the decided-on points are allowed for afterwards, and considered in the estimate. Direct speaking-tubes are also provided for between the engineer's office and the points where the principal channels commence, the principal hall, &c., telephonic communication with the upper stories, and a pneumatic-tube from the mixing chamber to the office for entering the trials of the air.

Hot-water Heating.—Each of the four groups for the four parts of the building is divided into two systems with separate boilers; one of which serves in each case for the library, office, dwellings, and closets, the other for the remaining rooms, so that the first can be warmed independently of the action of the whole arrangement. Both boilers and systems are connected with each other, provided with valves, and can be put in action at pleasure, either singly or together.

Arrangement in the individual Rooms.—The air streams into the individual rooms at a suitable height above the floor, near the ceiling or the floor, as needed, and in turn goes from them. Close-shutting flap-valves, simply constructed, are provided everywhere. In the larger rooms the internal architecture will give the possibility to introduce a further division of the air. Proposals for these, however, must remain reserved for special working out, as with these the constructional considerations are of corresponding influence, and detailed working drawings, for instance, are not yet to the present time before us.

Principal Hall.—For the principal hall, the possibility of bringing in the air direct in the most simple and natural manner follows from the existence of a fixed situation, and of a large area at disposal under the floor, viz., equally distributed under all the seats. As the air streaming in is tempered to 20° C. (68° F.), and enters with a minimum speed under the seats, every possibility of a troublesome draught is excluded. By the warmth of the human body, and the products of respiration, the temperature of the air is raised. This rises to the ceiling, and there immediately follows the carrying away of it in accordance with natural laws. The arrangement of the principal hall is disposed to correspond with this. As, however, a good effect can also be attained by another situation for the inlets, the choice of one or other of the arrangements may depend on personal views. [It appears that the author of the scheme contemplated having the power of reversing the localities of inlet and outlet for the great hall or Parliament House proper, and prepared a special section showing the air propelled or allowed to rise through upcast shafts first and entering through the cove in the ceiling, being then drawn off through the floor. The section (fig. 3) indicating this arrangement is the one that has been sent to us for illustration of the scheme, somewhat illogically. It shows, however, the three tiers of chambers under the floor of the great hall, as described; but in regarding it as an illustration of the scheme as above described, the direction of the arrows at the cornice and floor of the hall must be regarded as reversed, and the "zuluft-canal" (inlet shaft) shown at the left of the section of the hall must be regarded as a descending exhaust shaft communicating with the main exhaust shafts ("abluft-canäle") shown on the extreme right and left of the section. These apparently remain the same in both cases; but in the scheme which the author (rightly, we think) prefers, of admitting the warmed air below and taking it out above, the vitiated air is drawn down first and sent up again through the main exhaust chimneys. In the second or alternative scheme it passes direct from the floor of the hall to the "abluft" chimney. —ED.] The following may yet be noted with regard to the arrangements chosen in the scheme before you to make possible an exact control of the temperature of the air entering through the floor. An air-reservoir must be formed under the hall, in which the air is already found at its proper temperature; further, we must be able to effectuate quickly and surely the regulating during changes in the sitting of the House; for example, during divisions. For this purpose two stories, sufficiently high to pass through, are to be formed over the cellar story, between the floors of the lower story and of the hall, by the insertion of a middle floor. The freshly-warmed air (tempered to about 17° Cent., say 62° Fahr.) streams out of the preliminary warming-chambers to the ventilators in the cellar story. From these the air is passed on to the next story, where it is divided into two rooms situated in a parallel line against each other, of which one is heated. Around the other, between the heated and unheated chambers, is left a passage, 1 mètre (about 3 ft. 4 in.) wide, that can be placed in communication with the more or less warmed chambers by means of regulating slides (the slides are movable outwards from one position by means of simple rollers and draw apparatus). These mixing passages open upwards towards the third story, the control-room. According to the height of the control thermometer, less or more warm air is admitted to the mixing passages, and by this means the proper temperature is already formed below the floor for every part of the hall. One part of the control-room is separated for the Tribunes, that the temperature of those may be independently regulated. Corresponding to this special carrying-off channels are arranged. The thermometers are connected electrically with signals in the engine-room and control-office. The warming-chambers of the hall are provided with warm-water heating (low-pressure), to regulate with certainty the mildest tempering of the air, and to gain a constant supply of moderately warm air for regulating purposes. The draw-off channels are led down to the lower story, having a total sectional area of 6·25 square mètres (about 67½ square feet) for both sides of the hall united there by the shortest route and connected with the aspiration shafts. During the heating of the hall it would not be advantageous to take off the warm air at the ceiling. The disposition hit upon makes possible in the simplest manner the carrying off of the air at the floor by reversing the valves to the suction-channels leading past at the sides. Lastly, the position of these channels affords the advantage still, of no small value, of being able to attain during the cleaning of the hall a complete and sure removal of all dust particles. For this object the control-room is placed in connexion with the suction-channels by large (closely-shut) openings. When these openings are set free, and at the same time the doors and skylight over the hall opened, a streaming in of fresh air, but weak, is maintained thereby towards the control-room by a corresponding fixing in of the slide-valves to the air-chambers, and when, in the last place, both suction-shafts are claimed for the hall alone at the same time, by shutting off the other parts of the building, it is possible to effect the most thorough cleansing and the removal of all dust particles directly towards the suction-shafts.

Total Cost.—The total cost of this design is indicated in the estimate of cost, according to which it amounts to about 482,500 marks (about 23,652*l.*). To this it should be noted that all dimensions are calculated for the attainment of an effect according to the programme (conditions) at the same time in all rooms.

Action.—In making use of a centralised scheme of the importance of the one projected, it is not sufficient so to manage the working that any irregularities which may happen can be remedied in a supplementary way; measures should be taken to prevent complaints at the first. This is only possible when the working is carried out with regard to all the conditions coming under observation, number of the rooms used, frequency of their use, external temperature, height of the barometer, degree of moisture, direction of the wind, &c., on the basis of a continuous observation of the working in every part of the general arrangements. An engineer should for that reason be appointed on whom the responsible superintendence is incumbent, who works at and revises regularly the reports on the course of all the apparatus, determines in the first place the principles for regulating it on the basis of actual observations, and issues special instructions for particular cases. The general management of the apparatus follows from the disposition thereof without anything further. Subordinate to the engineer, besides the staff of the boiler-house, who are not to be considered here, are an engine attendant (chief stoker), two permanent stokers, and an

assistant stoker (as a reserve and for educating as a substitute during changes in the staff). The management of the complete practical service is subject to the chief stoker, according to the directions of the engineer. The three stokers attend to the separate parts of the building (middle building, north and south), with a relief or respectively a change so that each becomes acquainted with all the parts; prepare the reports on the height of the thermometer, hygrometer, anemometer; and look after the cleaning and maintenance of all apparatus and working-rooms. When in full working order a regular round should be organised through all the rooms, and specially through the principal air-galleries and heating-chambers."

THE ROYAL ARMS.

WE have a modern version of the herald's visitations of the latter part of the Middle Ages in our Government calling upon all tradesmen (and their name is legion) using the Royal arms to show by what authority they do so. We therefore venture in this article to give a short account of the origin and history of our national shield and its accessories.

"Let us begin at the beginning," says Planché in "The Pursuivant of Arms," &c. We cannot do better than follow such advice. But where is the beginning? Well, putting aside all conjecture and all tradition that are unsupported by examples, we cannot give an earlier origin to "the Royal coat" than the reign of Richard I., whose seal is engraved with the three "lions of England," even as we now behold them on every side of us.

And here we must pause to add that perhaps, strictly speaking, according to the rules of heraldry, our Royal animals are only leopards. Much has been written on this point, and it has been very hotly contested, but lions they have ever been in the paths of our enemies and lions they must ever remain.

This shield of our "Cœur de Lion" was borne by his unworthy successor John, by Henry III., Edward I., II., and III., until the thirteenth year of the latter's reign, when he quartered the "fleur-de-lis" with the lions, thus showing his claim to the throne of France through his mother, who was a French princess, and this quartering was retained by us till the present century. And here we must pause again to put the unanswerable question,—What *is* the "fleur-de-lis?" Well, some writers have held that it represents a flower, others say the head of a sceptre, others again assume it to be the point of a spear, and yet again it is claimed as a frog or a toad! Books upon books have been written on this mystery and we are as much in the dark as ever.

The shield assumed by Edward III. "holds good" until about the year 1405, when the number of the *fleurs-de-lis* was reduced to three in each quartering to correspond with the alteration made by the French, and commonly known as "France modern," as distinguished from "France ancient," the former quartering. We have now reached the reign of Henry IV.

This shield of "France modern" and England quarterly will carry us on to the reign of James I., who brought in the Scottish lion rampant, the origin of which, as a writer observes, "is veiled by the mists of antiquity." The Irish harp was introduced at the same time. These "arms of the Stuarts" will run till May 1st, 1707, when Anne bore England impaling Scotland, France modern, and Ireland.

The "Arms of Hanover" came with George I., and were retained until the accession of Queen Victoria.

The "fleurs-de-lys" were removed from the Royal shield of Great Britain on the 1st of January, 1801.

The Royal crest is a lion standing on a crown, and wearing a crown, and was first borne by Edward III. on a cap of estate. We must say a few words about the "supporters" of our Royal arms, and here we have no authority for going farther back than Henry VI., who bore two white antelopes, also a lion and a panther, or an antelope. Edward IV., a lion and a bull, or a lion and a hart. Richard III., a lion and a boar, or two boars. Henry VII., a dragon and a greyhound, or two greyhounds, or a lion and a dragon, and all the Tudors bore the same supporters with slight variations.

The familiar "lion and unicorn" date from the accession of James I., and have remained undisturbed until the present day.

The origin of supporters is another of the many disputed points in heraldry into which we cannot enter. They are of great service in determining the date of any building that bears them. The motto, "Dieu et mon droit" was assumed by Henry VI., and has held its ground ever since. It was an ancient English war-cry.

With regard to the crown, all our monarchs since Henry IV.'s time have worn it with two arches, with the exception of Henry VI. and Charles I., who arched their crowns three times, and this is sometimes a clue to a date.

The Royal banners or standards are charged with the bearings of the shield of arms for the time being.

We cannot tell why Wales should have been left out in the cold, but it is a fact that the Principality has never been represented on the national shield, and it is a fact to be regretted.

INSTITUTION OF CIVIL ENGINEERS:

THE PRESIDENT'S ADDRESS.

SIR FREDERICK BRAMWELL delivered a very able and interesting address on Tuesday evening last, on taking the chair, for the first time since his election, as President of the Institution of Civil Engineers. We make the following extracts from it,—Principles are generally very soon determined, and progress ensues, not by additions to the principles, but by improvement in the methods of giving to those principles a practical shape, or by combining in one structure principles of construction which had been hitherto used apart. So far as novelty in the principle of girder-construction is concerned, I must confine myself to that combination of principles which is represented by the suspended cantilever, of which the Forth Bridge, only now in course of construction, affords the most notable instance. It is difficult to see how a rigid bridge, with 1,700 ft. spans, and with the necessity for so much clear-headway below, could have been constructed without the application of this principle. The St. Louis Bridge of Mr. Eads may, I think, be fairly said to embody a principle of construction novel since 1862, that of employing for the arch-ribs tubes composed of steel staves hooped together. In suspension bridges there has been introduced that which I think is fairly entitled to rank among principles of construction, the light upper chain, from which are suspended the linked truss-rods, doing the actual work of supporting the load, the rods being maintained in straight lines, and without the flexure at the joints due to their weight. In the East River-bridge, New York, there was also introduced that which I believe was a novelty in the mode of applying the wire cables. These were not made as untwisted cables, and then hoisted into place, thereby imposing severe strains upon many of the wires composing the cable, through their flexure over the saddles and elsewhere, but the individual wires were led over from side to side, each one having the length appropriate to its position, and all, therefore, when the bridge was erected, having the same initial strain and the same fair play. The employment of testing machines has come into the daily practice of the engineer. In lieu of such machines being used, by the few, and at rare intervals upon small specimens, for experimental purposes, they are now employed in daily practice and on a large scale. In harbour work we have had the principle of construction employed by Mr. Stoney at Dublin, where cement masonry is moulded into the form of the wall, for its whole height and thickness. By a very carefully thought-out apparatus blocks are raised off the seats whereon they have been made, and are transported to their destination. It is no simple undertaking (even in these days) to raise (otherwise than hydraulically) a weight of 350 tons, which is the weight of the blocks with which Mr. Stoney deals. An extremely ingenious mode of dealing with the slack chain prevents its becoming fouled and not paying out properly when the block is being lowered. This is accomplished by reeving the slack of each chain over two fixed sets of multiple sheaves, and, automatically, the slack is kept clear. A noteworthy instance of the use of pneumatic appliances in cylinder-sinking for foundations is that in progress at the Forth-bridge. The wrought-iron cylinders are 70 ft. in diameter at the cutting edge, and have a taper of about 1 in 46. At their bottoms there is a roofed chamber, into which the air is pumped, and in which the men work when excavating, this roof being supported by ample main and cross lattice girders. At the Tay-bridge, also now in course of construction, the cylinders are sunk, while being guided through wrought-iron pontoons, which are floated to their berths and are then secured at the desired spot by the protrusion, hydraulically, of four legs, which bear upon the bottom, and thus, until they are withdrawn, convert the pontoon from a floating into a fixed structure. Modes of "cut and cover" have been proposed for the performance of sub-aqueous work, sometimes by means of cofferdams, and with the work therefore open to the day-light during execution, and sometimes by moveable pneumatic appliances. A construction known to very few is the diving apparatus known as the "Bâteau-plongeur," and used at the "barrage" on the Nile. This consists of a barge fitted with an air-tight cabin, provided with an air-lock, and having in the centre of its floor a large oval opening, surrounded by a casing standing up above the water-line. In this casing another casing slides telescopically, the upper part of which is connected to the top of the fixed casing by a leather "sleeve." When it is desired to examine the bottom of the river the telescopic tube is lowered till it touches the bottom, and then air is pumped into the cabin until the pressure is sufficient to drive out the water, and thus to expose the bottom. This appears to be a very convenient arrangement for shallow draughts of water. Mr. Stoney uses for the greater depths he has to deal with, when preparing the bed to receive his blocks, a diving apparatus which (while easily accessible at all times) dispenses with the necessity of raising and lowering, needed in an ordinary diving-bell, to allow of the entrance and exit of the workmen. Mr. Stoney employs a bell of adequate size, from the summit of which rises a hollow cylinder, furnished at the top with an air-lock, by which access can be obtained to the submerged bell. In the dress of the diver there has been general improvement in detail and manufacture, in the application of the telephone, and in the introduction of the chemical system of respiration, the invention of Mr. Fleuss. He has succeeded in devising a perfectly portable apparatus containing a chemical filter, by means of which the exhaled breath of the diver is deprived of its carbonic acid; the diver also carries a supply of compressed oxygen from which to add to the remaining nitrogen oxygen in substitution for that which has been burned up in the process of respiration. Armed with this apparatus a diver is enabled to follow his avocations without any air-tube connecting with the surface; indeed, without any connexion whatever. A notable instance of a most courageous use of this apparatus was afforded by a diver named Lambert, who, during one of the inundations which occurred in the construction of the Severn Tunnel, descended into the heading, and, proceeding along it for some 330 yards (with the water standing some 35 ft. above him), closed a sluice door through which the water was entering the excavations, and thus enabled the pumps to unwater the tunnel. Altogether on this occasion this man was under the water and without any communication with those above for one hour and twenty-five minutes. The apparatus has also proved to be of great utility in cases of explosion in collieries, enabling the wearer to safely penetrate the workings, even when they have been filled with the fatal choke-damp, to rescue the injured or to remove the dead. In sub-aqueous work, where the influx of water is a source of great difficulty, perhaps nothing has been devised so ingenious as the Thames Tunnel shield; improvement has, however, been made by the application of compressed air. In the instance of the Hudson River Tunnel, the work was done in the manner proposed so long ago as the year 1830 by Lord Cochrane (Earl Dundonald). There are, happily, cases of sub-aqueous tunnelling where the water can be dealt with by ordinary pumping power, more or less extensive, and where the material is capable of being cut by a tunnelling-machine. This was so in the Mersey Tunnel and would be in the Channel Tunnel. In the Mersey Tunnel and in the experimental work of the Channel Tunnel Colonel Beaumont and Major English's tunnelling-machine has done most admirable work. In the 7 ft. 4 in. diameter heading in the new red sandstone of the Mersey Tunnel a speed of as much as 10 yards forwards in twenty-four hours has been averaged, while a *maximum* of

of 11 yards 2 ft. has been attained; while in the 7 ft. heading for the Channel Tunnel, in the grey chalk, a *maximum* speed of as much as 24 yards forwards in the twenty-four hours has been attained on the English side, and with the later machine put to work at the French end a *maximum* speed of as much as 27 yards 1 ft. forwards in the twenty-four hours has been effected. In ordinary land tunnelling since 1862 there has been great progress by the substitution of dynamite and preparations of a similar nature for gunpowder, and by the improvements in the rock-drills worked by compressed air, which are used in making the holes into which the explosive is charged. For boring for water and for many other purposes the diamond drill has proved of great service, and most certainly its advent should be welcomed by the geologist, as it has enabled specimens of the stratum passed through to be taken in the natural unbroken condition, exhibiting not only the material and the very structure of the rock, but the direction and the angle of the dip of the beds . . . .

In the days of Brindley and of Smeaton canals and canalised rivers formed the only mode of internal transit. The competing railway was in a position to take away even the local traffic of the canal. Canal proprietors have from time to time endeavoured to improve the rate of transport, and with this object have introduced steam in lieu of horse haulage, and by structural improvements have diminished the number of lockages. By inclined planes barges were transferred from one level to another; but an important improvement is the application of direct vertically-lifting hydraulic power. This system reduces the consumption of water and the expenditure of time to a *minimum*. With respect to canalised rivers, if means could be devised for giving full effect to the river channels for flood purposes, while maintaining them for the provision of motive power and of navigation, it is desirable that this should be done. The great step in this direction appears to be the employment of readily, or it may be of automatically, movable weirs. Messrs. Vernon Harcourt and R. B. Buckley, in the session of 1879–80, dealt with foreign, notably with French and Indian, examples. An instance of improvement since then has been the construction by Mr. Wiswall, the Engineer to the Bridgewater Navigation Company (on the Mersey and Irwell section of that navigation), of the movable Throstle Nest Weir at Manchester. By the adoption of movable weirs, rivers in ordinary times may be dammed up to retain sufficient water to admit of a paying navigation and water for the mills on their banks, while in times of flood they shall allow channels as efficient for relief as if every weir had been swept away. The great feature of late years in canal engineering is the provision of canals for saving circuitous journeys in passing from one sea to another, or for taking ocean steamers many miles inland. But the old fight between the canal engineer and the railway engineer, or, more properly speaking, between the engineer when he has his canal "stop" on and the same individual when he has his railway "stop" on was revived, even in the case of the transporting of ocean vessels from sea to sea, for Mr. Eads is proposing to connect the Atlantic and the Pacific Oceans by means of a ship-railway across the Isthmus of Panama. He suggests that the largest vessels should be raised out of the water in the manner commonly employed in floating docks, and should then be transferred to a truck-like cradle on wheels, fitted with hydraulic bearing-blocks (this being, however, not a new proposition as applied to graving docks), so as to obtain practical equality of support for the ship, notwithstanding slight irregularities in the roadway; while he proposes to deal with the question of changes of direction by the avoidance of curves and by the substitution of angles, having at the point of junction of the two sides turntables on which the cradle and ship will be drawn. These can be moved with perfect ease, notwithstanding the heavy load, because the turntables will be floating in water contained in circular tanks. The question of preserving the level of the turntables, whether unloaded, partially loaded, or loaded, is happily met by an arrangement of water ballast and of pumping. Mr. Eads has so dealt with the mouth of the Mississippi as to cause that river to scour and maintain a channel 30 ft. deep at low water, instead of that at 8 ft. deep which prevailed there before his skilful treatment. Sir Charles Hartley has been successful in improving the navigation of the Danube, and one of the lectures of the forthcoming series, on "Inland Navigation," is to be delivered by him. There are many improved machines for excavating, to be used either below water or on dry land. . . . . Probably few materials have been found more generally useful to the civil engineer in works which are not of metal than has been Portland cement. During the last twenty-two years great improvements have been made in the grinding and in the quality of the cement. The artificial material, brick, cannot in these days be said to surpass in quality the bricks used by the Romans in this island 1,900 years ago, but as regards the mode of manufacture and the materials employed there is progress to be noted. The brick-making machine and the Hoffmann kiln have economised labour and fuel, while attempts have been made, which I trust may prove successful, for utilising the clay which is to be found in the form of slate in those enormous mounds of waste which disfigure the landscape in the neighbourhood of slate quarries. Certain artificial stones, moreover, appear at last to be made with a uniformity and a power of endurance, and in respect of these qualities compare favourably with the best natural stone, and still more favourably having regard to the fact that they can be made of the desired dimensions and shape, thus being ready for use without labour of preparation. Of timber in new countries the engineer is commonly glad to avail himself to an extent which among us is unknown. Owing to the ready adaptability of metals to the uses of the engineer the employment of wood is decreasing. Many attempts have been made to render timber proof against the two great defects of rapid decay and of ready combustibility. The asbestos paint is used to coat the wooden structures of the Inventions Exhibition. To the employment of this it is not too much to say those buildings owed their escape in last year's very dry summer from being consumed by a fire that broke out in an exhibitor's stand, destroying every object on that stand, but, happily, not setting the painted woodwork on fire, although it was charred below the surface. A surface application may not enable wood to resist the effects of a continued exposure to fire, but it does appear that it can prevent its ready ignition. Eight years since I delivered at the Royal Institution a lecture on "The Future of Steel," and every year that has passed has justified the opinions I then ventured to put forward as to the way in which steel, made by fusion, would supersede iron made by the puddling process; and I am not afraid to repeat my prophecy that the time will come when the use of iron made by that process will be restricted to the manufacture of the small articles produced by the hand labour of the village blacksmith, for whose art its plastic character and ready power of welding eminently fit it. . . . Excepting in the magnitude of the work and the excellence of the design, of which the new Liverpool waterworks now in progress may well stand as a typical example, there is not much to say as regards progress in those waterworks which are dependent upon storage. In the United States and Canada the waste of water that takes place not only causes the mains to be incapable of keeping up the pressure under the excessive draught, but renders sources of supply insufficient which otherwise would be ample for years to come. Progress has been made here in the matter of house-fittings, by which waste has been greatly checked, and the risk of contamination that formerly existed with certain closet-fittings is ended. This question of house fittings has always been a difficult one, and cannot be grappled with by water authorities such as those in the United States and in Canada, *i.e.*, municipal authorities afraid of offending the voter. We owe it, however, to Mr. Deacon, the engineer of an English municipal water authority, that it is now possible to deal with the correction of household fittings at a minimum of cost, and, what is equally important, with a minimum of annoyance to the householder. By the employment of the waste-water meter, situated under the flagstones of the footway, and controlling a group of houses, it is possible to find out the total waste in the whole of those houses, and on the mains supplying them; then to localise that waste so as to attribute its true proportion to the houses that are the offenders, and to attribute the proportion, if any, to the pipes of the suppliers of water. Having ascertained these facts, not only can the suppliers of water cure the defects in their pipe system, but they are enabled to cure the household waste, not by the expensive and annoying process of an inspection of the fittings throughout the whole district, involving the annoyance of, say ninety householders whose fittings are in perfect order to detect the ten householders whose fittings are in a reprehensible condition, but by the mere visitation of these ten who are in default, and who cannot, therefore, complain of the visitation. In most of our towns the supply is satisfactory, but in spite of the alarm raised by the suggestion of double mains, we might do well in many cases where there is a pure but limited supply to have a dual system of mains, and thus to distribute the pure water separately and for potable purposes. The Parisians, at least, have recognised the expediency of thus sorting their supply when that supply is of varying quality, and when the best of it is limited in quantity. In cases where there appears to be no thoroughly satisfactory source of water, the experience of the efficacy of iron purification, as practised at Antwerp, does hold out very considerable promise.

THE APPROPRIATE ORNAMENTATION OF WORKS IN IRON.

THE following is a portion of a paper read last Wednesday evening, at the Civil and Mechanical Engineers' Society, by Mr. Richards Julian:—

"Before coming to the subject of exposed or visible ironwork, I should like to say a few words on the covering of such structural ironwork as is necessarily concealed, I mean in buildings which it is desired to render fireproof. In these cases it is now generally accepted as an axiom, "that no building can be fireproof unless all constructive ironwork is protected"; and here arises a strong temptation, in protecting the construction with concrete or terra cotta, to assume that one is at liberty to imitate the forms of stonework, and to revert to old and well-established proportions. The argument commonly advanced is: that in such a case your ironwork is the skeleton only, and that as in the human body the bones are clothed with a beautiful form unlike themselves, we may clothe our iron skeleton in any beautiful form that we like; but the analogy, as commonly applied, will not hold good; to cover the iron construction with an imitation of stone construction, is to cover a skeleton of iron, which is supposed to be ugly, with a sham skeleton proper to another body, which is held to be beautiful, instead of surrounding the bones with a beautiful exterior that shall still indicate their forms and proportions.

The application of our principles to such cases will lead us to indicate the forms of our construction, if, for instance, we have to protect a stanchion of the H-form, its general outline being a square or an oblong, suggests a clothing of similar form; if of the +-pattern, the plan

of its covering should preserve the cruciform shape in its faces while the angles might be filled in with splays or mouldings: such treatments are truthful, exhibit thoughtful design, and better preserve the proportions of the constructive forms.

A circular column would naturally have a circular encasement, but again the proportion should not be destroyed, and direct imitation of stone columns should be avoided as far as possible. Girders and cantilevers should be dealt with in the same manner.

The faces of the casing can, of course, be decorated with panelling, banding, and so on, in any way suitable to the material used for the purpose, and to its position. We thus see that, even where our ironwork is hidden, attention to artistic principles will guide us to original and appropriate ornamentation.

Coming now to exposed or visible ironwork, let us first glance at the natural treatment of wrought iron. We have here a material which can be rolled, hammered and forged, bent, twisted, or perforated, built up or framed and jointed, in various ways: the webs of plate girders and of cantilevers can be ornamented by perforation, while in built-up girders of the lattice or the Warren kind the actual construction often gives an ornamental form; the

various parts,—the lattices, for instance,—might often be made decorative by being fashioned or cut, especially where they are formed from plates rather than angle or T-irons, and the joints should receive more consideration artistically than is usually bestowed upon them; although no unnecessary features are to be added for the mere sake of ornament, a few pounds weight of iron added to the necessary features, to allow of their being made ornamental, as well as useful, is perfectly legitimate. The application of hammered scrollwork to some of the parts of built-up structures, if not overdone, is an evident means of obtaining beauty and giving interest to the work.

In large roofs, or in bridges, I look to the further development of the combination of cast with wrought iron, as opening a wide field for ornamental treatment.

When we turn to cast iron, we are dealing with a material which, as used for structural purposes, is but little older than the century in which we live, and for the treatment of which there is no direct precedent. Here we have a material which, as its name indicates, is cast in a mould, and which, consequently, shares with other materials, which are similarly treated, the liability,—owing to the cheapness with which such decoration may be produced,—to be ornamented with imitations of carved and hand-wrought work. There are, however, difficulties of manufacture connected with the casting of iron, especially in large pieces for structural purposes, which will guide and limit us in seeking for the appropriate ornamentation of it. One principal point is that in designing for cast iron, the material must, as far as possible, be of uniform thickness throughout, otherwise we shall have cracks and flaws in the process of cooling; this shows at once that our ornament should avoid anything like undercut carving, any system of design that calls for projecting knobs or blocks, which cannot be easily cored; it also shows that, for the same reason, our mouldings and surface ornament should be of slight projection, and without deep sinkings or hollows, unless the back of the casting can be made to follow the face surface, without affecting the strength, and without adding undue difficulty to the process of manufacture.

In designing a column or stanchion for execution in cast iron, we will consider first its form on plan. The circular hollow form gives, of course, the most economical use of material, but has certain disadvantages. You cannot get at the interior for examination or for painting, and you cannot easily see that you have the necessary uniform thickness of material throughout. For these reasons I am inclined to prefer the stanchion, as being better suited to the character of the material.

If, however, a hollow column be used, other forms than the circle may be adopted, such as the square, with rounded or moulded angles; the regular octagon, with or without projecting faces; the irregular octagon,—that is, one with four main faces and four subordinate ones, which may be moulded,—and others which will suggest themselves to you. The advantages of these forms of plan are, less likelihood of imitation of stone details, greater appearance of stability, owing to the actual increase in size, as well as to the apparent increase when such forms are seen in perspective, and the advantage which flat faces offer for the proper treatment of the capitals. The last reason also suggests that where circular columns are adopted, slightly projecting vertical fillets should be added, carrying down the lines of the brackets at the top, and giving an appearance of rigidity to the shaft.

In detached stanchions the cross-with-equal-arms plan seems the best in ordinary circumstances, but often the form of the stanchion should, I venture to think, be suggested by the superstructure which it has to carry.

In dealing with these supports in elevation, I will speak first of the capital or top. A capital, in the ordinary sense, as applied to a stone column, is not wanted at all; such a capital is a separate block of stone placed on the shaft, and ornamented by moulding or carving cut into its solid mass; these have, however, formed the types from which cast-iron capitals have been generally derived, and most unsatisfactory we all know their effect to be; for instance, we see a Corintbian capital, or some approach to one, in such a position; now, from association of ideas, we expect to find below a Corinthian capital a column of the usual Corinthian proportion, that is, about ten diameters high, including the cap and base: so by putting this capital, we challenge comparison between the proportion of our iron column and the old stone one, and the consequence is that the iron is denounced as a wretched, skinny abortion, or in some other equally uncomplimentary phrase.

In designing the top of a column or a stancheon for pure utility, as in some position where it is not to be seen, what do you do? You put at the top a projecting flange, somewhat like what we architects call the abacus, but with projection enough to allow of the proper bolting of the girder, or whatever else is to be carried; you then arrange brackets, cast on, to carry this top flange. Let us treat our ornamental capitals on the same lines and we shall satisfy our artistic principles, and not set a-going any invidious comparisons between our works and those of the masons.

I have ventured to prepare a sheet of illustrations showing how this may be attempted. I do not, of course, put these designs of mine forward as being perfect, or claim for them anything more than that they are attempts to grapple with the problem of uniting to sensible and natural construction such ornament as is appropriate to the nature of the material. You will see that I have everywhere used what I will call the bracket form of capital and shown how it may be applied to different kinds of columns and stanchions.

In dealing with the shafts all the edges may well be moulded in a very simple and refined manner. This is almost suggested by the difficulty of obtaining absolute squareness in section when you have to withdraw a casting from a mould. The surfaces may be panelled and the panels enriched, but all sinkings should, of course, be very slight, not only for the practical reason to which I have already referred, but because this again suggests the character of the material and its method of manufacture. Flutes running the entire length of the column should certainly be avoided; it is difficult to get true lines in them. They make a small column look smaller and taller than it really is, and they are imitations of a familiar form of stone ornament. Horizontal bands around the columns, however, will always tend to increase the apparent diameter, and so are valuable. Short lengths of fluting between these bands, and in such positions as the tops of the columns, where they add apparent stiffness and power to support the weight, may be used, but they should be small and sharp in section, instead of wide and flat, as in stonework, as they then suggest the hardness of the material.

In the cross-shaped stanchion you will see that I have introduced small horizontal stiffeners or flanges, and endeavoured to treat them ornamentally: although these only add slightly to the actual strength, they are very valuable artistically, as seeming to bind the whole together; they also serve the same purpose as the bands on the columns, by adding apparent breadth.

When foliated ornament is used, although we should not imitate stone or wood carving, we can hardly expect to invent an entirely new system of foliage for our purpose; and it is not only quite legitimate to turn to the works of the past for suggestions, but it is our duty to do so, otherwise we throw away a part of our heritage.

In what direction should we make our investigations? We require low relief, and that sharpness and crispness of outline which should accompany it, if it is to be effective This we shall find in the early Greek work which was executed in a hard material, in the Byzantine work, which inherited the traditions of the Greek, and,—for surface and panelled decoration,—in much of the early Renaissance detail; learning from these beautiful works of former ages, we may, without servile imitation, obtain in time a modified and consistent system of iron foliated ornament. One word more under this head. Our foliated ornament must be conventional; naturalesque decoration is seldom satisfactory in effect when applied to any part of a structure which appears to be doing work,—that is, carrying a load, or resisting a thrust, and never, unless it comes direct from the hand of the artist, in the form of carving or of painting.

The remarks which I have made as to mouldings generally apply of course to the ornamental bases of columns; these should have very slight projection, and be in no way imitations of the ordinary stone base, with its deep hollows, and bold rounds. The use of stanchions will get over all this difficulty, as each face would have its own projecting mouldings, possibly connected by a horizontal band.

In cantilevers or large brackets, modelled or perforated ornamentation will be used in the spandril panels, which the forms of these features will suggest. Such ornament might be arranged with projections, producing the effect on one side, and sinkings on the other, so that the thickness of the whole might be fairly uniform in all its parts. Cantilevers should never be cast hollow, but always with a visible web of the necessary thickness only.

In America whole fronts of business premises are sometimes constructed of iron; and in many cases, in our own city, where every inch of window space is of importance, the same system might be adopted with advantage. Such fronts, to be artistically good, will need very careful designing. We must cast ourselves loose from old traditions, and work in the spirit which I have tried to indicate to you. There must be no great hollow sham cornices and strings carried on hollow, closely-spaced cantilevers, such as I have read of in accounts of the American examples. With a sheet of drawing-paper and time to spare I think that I might work out something that should obey the laws of art, but, until I have done that, I am afraid that I can hardly launch into a detailed description of such a front. I should certainly start with honest stanchions and girders, and where I had any surfaces to cover, I think that wrought-iron plates with ornamentally-cut edges, or cast-iron modelled panels, would be the line I should first try."

THE SURVEYORS' INSTITUTION EXAMINATIONS, 1885.

UPWARDS of 100 candidates have entered their names for this year's examinations. Of these, fifty-five offer themselves for the Students' Entrance Examination, on the 20th and 21st inst., and the remainder for the professional examinations in April next for land agents, valuers, and building surveyors. Under the provisions of the Charter, candidates for the Professional Associateship can now enter by examination only. The Compulsory Examination for the Fellowship does not come into force for several years to come, but a considerable number of candidates who have already passed the Professional Associates' Examination have offered themselves for the voluntary examination for this class.

LINE OF FRONTAGE.

AT the Hammersmith Police Court Mr. William Pears, of Houghton-place, Ampthill-square, was summoned by the Metropolitan Board of Works for unlawfully, and without the consent in writing of the Board, erecting or causing to be erected certain buildings or structures known as Nos. 2 and 3, Elysium-row, King's-road, Chelsea, beyond the general line of buildings in the said row, contrary to 25 & 26 Vict., c. 102, sec. 75. Mr. Burton, solicitor, appeared for the Board, and Mr. Glyn for the defendant.

Mr. Geo. Vulliamy, the Superintending Architect, having been called to prove his certificate, stated that the buildings were 5 ft. in advance of the general line of buildings, and he had so certified.

Mr. Glyn raised an objection that the Board were out of time in taking their proceedings, six months having elapsed since the buildings were commenced, and that the shops were erected on ground previously occupied by old buildings; and called evidence to show that the works commenced in April last, and notice thereof given to the District Surveyor, and that the shops were erected upon the old site.

Mr. Paget said he should hold the objections good, and dismissed the Board's summons, with 5*l.* 5*s.* costs.

"**Wolves in Sheep's Clothing.**"—Under this title our monthly contemporary, the *Plumber and Decorator*, makes a good onslaught on sham plumbers and their ways, and calls attention to a number of little insanitary dodges, and the nature of the men who practice them. "The following announcement will give some idea of what manner of man the so-called plumber frequently is:—'X. Y. Z. buys all sorts of old furniture, &c., &c., at the best prices. If you want a plumber or general house repairer, go to X. Y. Z., who will execute the work *and take any old lumber in exchange.*' The man is disguised under the above initials, but we have reason to believe his name to be legion."

ARCHITECTURAL SOCIETIES.

Birmingham Architectural Association.—The third ordinary meeting of the current session took place at Queen's College on Tuesday evening last, when Mr. W. H. Kendrick, Vice-president, was in the chair. Mr. J. Goodman was nominated as an ordinary member. A paper was read by Mr. W. Hawley Lloyd, on "Four Years' Experiences of the Restoration of a Cathedral Church." The lecture was illustrated with a large plan of Worcester Cathedral, and several views and sketches made by the author during the period of the restoration. A vote of thanks, proposed by Mr. J. King James, seconded by Mr. J. Cotton, and supported by the Vice-president, was unanimously accorded to the lecturer for his interesting paper. On the motion of the Vice-president, seconded by Mr. Victor Scruton (hon. sec.), it was requested that Mr. Hawley Lloyd be good enough to supplement his remarks by conducting the members of the Association over Worcester Cathedral some time during the present session. The lecturer agreed to do so.

Edinburgh Architectural Association.—At the meeting of this society on Monday evening last, Mr. Washington Browne in the chair, Mr. John Kinross read a paper on the subject of "The Study and Progress of Architecture." After a humorous reference to the way in which many young men found themselves in what he called an "ill-paid profession," Mr. Kinross proceeded to notice the chaotic state in which the question of style was at present, and the difficulties which that presented to a student in determining what style he should devote his attention to. For a comprehensive study of architecture time and means were necessary, and he advocated, if that were possible, the study of the noble works of Italy and Greece, not merely from drawings, but as they stand on Italian and Grecian soil. The refining effect of such study could not be over-estimated. He differed from Fergusson in thinking that Scottish work was not worthy of study. There was much beautiful early work still remaining in Scotland, and also admirable domestic work, which, perhaps, deserved to be studied more than any other kind of Scottish work. Scottish country mansion-houses seemed to grow out of the ground; they fitted in to nature; and the proportion of their rooms and the beautiful detail that was in them made them worthy of study. In speaking of modern progress, Mr. Kinross said they had in Edinburgh a very brilliant example as to the effect of very careful study of the Italian Renaissance and a judicious use of the best materials; and they had a very fine example of what the study of their old Scottish would lead to in the new block built by Mr. Findlay at the Water of Leith. These buildings, though in very different styles, showed beautiful results of careful study and good taste. In England, it was remarked, great progress had been made during the last twenty years, and of that some account was given,—the work of the leading architects being referred to.

Leeds and Yorkshire Architectural Society.—On Monday evening Mr. J. A. Gotch delivered a lecture to the members of this Society at their rooms in Albion-street, Leeds, on "English Houses in the Seventeenth Century." The accommodation in those days was very much the same as it was now, but it was arranged in a much less convenient manner. Magnificence was the chief characteristic, and for this purpose a good deal of comfort was sacrificed. The lecture was illustrated by means of diagrams, one of which represented a place built by the Earl of Dorset, who succeeded Lord Burleigh in the office of Lord High Treasurer; another illustrated the house of a squire of the time, such as Francis Tresham, who was implicated in the Gunpowder Plot; and a third showed the house of Sir Walter Raleigh. The lecturer quoted from the works of poets of the seventeenth century, thus bringing contemporary witnesses to give their evidence with regard to the home life of the period. The President of the Society (Mr. Edward Birchall), who occupied the chair, said it was intended to have brought forward the question of the proposed incorporation of the society at that meeting, but the subject had been postponed.

Mr. Alfred Meeson, architect of the first Alexandra Palace, died at his residence, No. 4, Harley-road, South Hampstead, on Jan. 12th, 1885, aged 76 years.

A CLUB-ROOM AT THE INSTITUTE.

SIR,—Your correspondent last week [p. 85] appears to misunderstand me. For a number of years past the question has been brought up in a desultory way from time to time, whether the architectural profession could be provided with a *rendezvous*, of the nature of a club-room, probably at the Institute; and my proposal is that those who are in favour of such a measure might, perhaps, be encouraged at the present time to consider how far the recently-acquired and little-used "arbitration room" could be made available for this purpose. This purpose, as I understand, is simply to have a room at head-quarters set apart during two or three hours in the afternoon for a casual *rendezvous*, where a member, having anything on his mind, might expect to meet some other members to compare notes with. I am told this would be useful to many in business, and agreeable to many more in respect of fraternal intercourse. For my own part, I am disposed to support the principle to the utmost. I feel that our profession is sadly in want of some bond of real practical union, which this might be made to supply. The formal meetings of the Institute are not enough. I cannot help thinking that in my younger days we had more true fellowship amongst us than we have now. As we expand in numbers, our cohesiveness diminishes. Anything, therefore, that would serve to bring us together, not merely formally once a fortnight, but informally any day, would be a step in the right direction. Surely no one can dispute this in principle; how to accomplish the object, and under what restrictions, I regard as matters of detail.

ROBERT KERR.

RIGHT OF WAY.

SIR,—Can any of your readers inform me if there is a fixed width for a private right-of-way entrance for carts and vans over one field to another for agricultural purposes? If so, what is the width, and do you measure from hedge or ditch, or where could I get the information? It is an acquired right by user, not by grant, and is situate in Essex.

I am about to lay a field out for building, and this entrance is on one side of it, next the ditch, and I want to know what width I must give. A. B.

CHURCH-BUILDING NEWS.

Macclesfield.—The parish church, dedicated to St. Michael, was re-opened, after partial restoration, on the 7th inst. Probably the only part of the original edifice is some portion of the basement of the tower. This tower, and the two chapels on the south side (one belonging to the Leghs of Lyme and the other erected by Thomas Savage, archbishop of York, who died A.D. 1507), are the only portions of the edifice which boast of anything like antiquity. It is intended to thoroughly restore the church in sections, and this present section, No. 1, just completed, embraced, in the main, the extension of the chancel and north aisle eastward, and the additions of clergy and choir vestries on the south side. The state of the vaults by which the basement of the edifice is everywhere fairly honeycombed, gave rise to many unexpected difficulties, but all the work is now well got over. Tegsnose, Cefn, and Alderley stones are used in the new masonry, and the roofs are of oak. There is a handsome mosaic floor in the chancel, into which a large figure of St. Michael is skilfully introduced. This is by Messrs. Patterson, of Manchester. The stone carving is by Mr. Harry Hems, of Exeter, and the heating apparatus, which has been placed under the north chapel, has been supplied by Mr. Harlow. Mr. Westwood did the gas-fitting, and Messrs. Martin, Farrar, and Mellor the glazing. The general contractor was Mr. H. S. Aspinall, of Macclesfield, and the architect under whom the works have been carried out was Mr. James Stevens, F.R.I.B.A., of Mosley-street, Manchester, and Macclesfield.

Chipping Norton.—In connexion with the restoration of St. Mary's Church, Chipping Norton, a handsome marble mosaic pavement has been laid in the chancel, also Irish fossil steps. The whole of the aisles, &c., have been laid with marble mosaic, the work being done by Mr. Jos. F. Ebner, Clerkenwell-road, Hatton Garden, London.

Brampton (Hunts).—A new reredos, designed by Mr. A. W. Blomfield, was fixed in this church for the Christmas festival. It is executed in rich-coloured alabaster. In the centre arch is the Crucifixion, and in the side arches Dorcas and Mary of Bethany, the nobleman of Capernaum and Cornelius; these are of painted tiles and mosaic, by Messrs. Powell & Sons, of Whitefriars; and the alabaster work is by Messrs. Earp, Son, & Hobbs, of London and Manchester.

Hernhill.—The ancient and picturesque parish church of Hernhill, Kent, was the scene of an interesting service on the 3rd inst., the occasion being the dedication of a reredos, which has been presented to the church by Mrs. Warton, of Kemsdale. The nave of the church was restored some six years ago, but the east end of the chancel presented a somewhat bare and unfinished appearance. This is now remedied by the erection of the reredos, which is of Caen stone, with pillars and facings of marble. A special interest attaches to this material, as it was procured from the ruins of Rome. The reredos was designed and executed under the direction of Mr. James Forsyth, of Hampstead, whose works in our cathedrals and elsewhere are well known. The design includes the various Evangelical symbols; the Alpha and Omega, at the extremities; and the Latin and Greek monograms of our Lord's titles, on each side of the central compartment, in which is represented the Archangel Michael,—the parish church being dedicated in his name. Curtains, which were manufactured by Messrs. Helbronner, are hung between the reredos and the north and south walls. The reredos has been erected as a memorial of the late Mr. Charles Warton, J.P., by his widow.

The Student's Column.

LIME, CEMENT, AND THEIR USES.—III.

THE theory of a lime-mortar is not quite the same as the theory of a cement-mortar, for the reason stated when describing the natures of limes and cements. The cement being strongest when used by itself, it necessarily follows that all additions of sand reduce the strength of the mortar, and that the quantity of sand added determines the strength which is required of the mortar; in fact, the cement is "let down" to the desired strength by the addition of the sand. A lime-mortar is different; it has been explained that limes, more especially the rich limes, have but little power of cohesion, therefore when used neat they are at their weakest; but by the addition of sand in a proper proportion the lime, by adhering to each particle, is enabled to develop its full power of adhesion, while the requirements of cohesion are reduced to the minimum, or that a lime is "worked up" to the desired strength by the addition of the sand. Thus, though the desired result is obtained by the same means, whether using cement or lime as a matrix, the action in the one case is exactly the reverse of the other. The object to be obtained is, of course, the maximum of strength at the minimum of cost.

It will now be seen in what manner the size and form of the grains of sand act in producing a strong and economic mortar. Whether it be a cement or lime mortar which is being made, the object is to surround each grain with a coating of the matrix, that the coating of matrix shall be even in thickness throughout the mass, and that there shall be no space between the grains of sand, which must either be left vacant, or must be filled with the matrix. In the former case they would be a source of weakness, and in the latter there would be a waste of material. A round globular grain is evidently, therefore, the worst that can be used; if a perfectly square grain of even size could be found, and it could be ensured that the grains would all lay square with each other, the minimum of matrix would be required, for the mortar would be itself like a piece of masonry. This, however, is impossible, even if it were desirable. Now if a sand is obtained which is composed of sharp irregular-shaped grains, of varying size, it can be well understood that the matrix can be so intimately mixed with it that while in some cases the larger pieces are in juxtaposition on some part of their surface, the smaller grains would fill up those voids caused by their irregular form, and a thoroughly homogeneous mass secured, which would contain the maximum of sand with the minimum of matrix.

There has lately been a considerable correspondence in the columns of the *Builder* as to the value of sea sand as a building material,—the question asked being whether the salt would not act deleteriously on the mortar made with it. It may be at once stated that if the sand is to be used for concrete underground, or anywhere out of sight, where the efflorence arising from the presence of the salt is of no importance, sea sand has the same value as other

sand, which value would be determined in the ordinary way by its sharpness and size of grain; for it must not be assumed that sea sand is always the same,—it varies as do all things in nature. As a rule, however, sea sand is mechanically a good building sand, but for the purposes of ordinary work it must be washed with clear water, and washed well, in order to remove from it all traces of salt; otherwise the salt will continually work out to the face of the work, and spoil it by efflorescence and dampness. For this reason only must the salt be eliminated. As a matter of constructional strength a partially-washed sea sand may be of more value than one perfectly washed, for chloride of sodium in sea salt, in small quantities, though it retracts the setting of limes and cements, eventually increases their hardness.

The larger pieces of stone or aggregate which are used to make a concrete deserve equal, if not greater, care in their selection than the sand. The definition of a sound concrete is the same as that of a mortar, with the difference that in the case of concretes the mortar, *i.e.*, the combination of cement or lime and sand, may be considered as the matrix and the stones as the aggregate; it follows, therefore, that no two pieces of aggregate must be in contact, but each must be surrounded by the matrix, as is each grain of sand in a mortar.

The aggregate should be strong, as it is impossible to make strong work with weak materials; it should be irregular and angular in form, and it should be clean. The definition of the word "clean" is but indifferently understood. Many are under the impression that if a quantity of clean stone or rock is crushed or broken to the desired size, the resulting crushed stone is clean. Now, for practical purposes, such is not the case. In crushing or breaking a stone a certain amount of fine impalpable powder is produced, and this is as detrimental to the production of a good concrete, as is loam or any other earthy matter. An aggregate, therefore, should always be washed after, and not before, it has been reduced to the proper size.

In selecting an aggregate smooth glassy surfaces should be avoided,—rough and uneven surfaces, having a certain porosity, make the best concrete, owing to the better adhesion which the matrix has to them. For this reason, when a river ballast or shingle is used it should always be broken in order to break up and destroy the rounded and even surfaces,—but ballast or shingle does not under any conditions make the best concrete, and should only be used for foundations, and similar work where it is not likely to have to withstand anything but a crushing force. The best concrete is produced with aggregates possessing the already-mentioned desired properties, such as hard limestones, granites, &c.

The size of the aggregate must vary according to the magnitude of the work in which it is used; the larger the aggregate the less matrix is required, resulting in economy in cost; in foundations, and backing of retaining walls, very large aggregate may be used, provided it is of sufficient strength to withstand the crushing weight put upon it; but in more finished work, where appearances have to be considered, and where it is subjected to other strains besides that of crushing, such, for instance, as walls, floors, &c., it is generally advisable to crush the aggregate to such a size that it will all pass through a ring 2 in. in diameter, for paving slabs, window-sills, steps, and other purpose-made concrete it is usual to crush the aggregate so that it will all pass through a sieve having holes $\frac{3}{4}$ in. square.

The proportion of aggregate to matrix is a matter which requires care in determining in order to obtain the best results; the proportion is determined primarily by the strength required, and secondly by the attainment of that strength at the minimum of cost. The point where strength and economy are attained is when the larger and smaller aggregates and the matrix are so balanced that a solid concrete is produced, without excess of matrix. A very good way of arriving at the amount of matrix required is to take a fair sample of the aggregate which it is proposed to use, divide it by means of sieves into three portions; first, the fine representing the sand, which would form with the cement the matrix; secondly, the smaller pieces of aggregate; and thirdly, the larger pieces of aggregate. If sufficient of the larger aggregate be now taken to fill a bucket, or other similar vessel, and water poured into it until it is full, and the water then measured into another vessel, the exact quantity of smaller aggregate and matrix required to fill the interstices between the larger is ascertained. The height of the water in the measure should be marked and the measure emptied; the smaller aggregate should then be placed in it up to that mark, and water again poured in until the aggregate is just covered; this water, if again poured into a measure, will determine the amount of matrix, *i.e.*, the sand and cement, required to fill the interstices between the smaller aggregate; to the quantities thus arrived at it is necessary to add from 10 to 15 per cent. to allow for the matrix which would be required to go between each piece of aggregate. The quantities of matrix can then be composed wholly of cement or lime, or of one of cement to any proportion of sand which it is thought will be sufficient to give the desired strength. It is perhaps right to mention that the separation of the aggregates into three parts in order to determine the proportion of matrix required, varies somewhat from the usual practice, which is to measure the aggregate in one only; but though taking slightly more trouble, it has the advantage of determining the proportion which the fine, small, and large aggregates bear to each other, and allows of a correction being made in the preparation of the aggregate, should either one be found to preponderate, or be deficient in quantity, and thus a better and sounder concrete is obtained.

The knowledge of the whole of the materials of which mortar is composed having been acquired, the proper means of using them must be studied in order that good and economical results shall be obtained, and the way in which a mortar or concrete is made has as much to do with the result obtained as the choice of good materials; for though it is impossible to obtain a satisfactory result from bad materials, it is always possible to obtain a bad result from the very best materials if they are improperly used.

Errata.—In the second paper on this subject, given by us last week, the reader will, perhaps, note the following corrections:—Page 87, col. 1, line 20 from top, for "need not" read "*must* not." In the same column, line 34 from bottom, read "never increases much more *in strenoth*." On same page, centre column, line 13 from bottom, for "just merits attention" read "*first* merits attention."

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

5,936, Improvements in Flooring Cramps. T. Thornton.

The improvements over the ordinary form of flooring cramp are chiefly that the distance between the fulcrum and the weight is lessened by means of a movable end added to the sliding bar, whereby greater leverage is obtained. There are also points of novelty and usefulness in an improved wedge attachment for releasing the bar, and in the tongue until the spring actuating it. A movable end or falling piece is attached to a sliding bar; this piece falls below the end of the bar against a projection or abutment under the bar. A ledge or rim is made on the underside of the wedge to move in a corresponding groove in the sides of the box for the purpose of keeping the wedge when slack or free from the tongue. The tongue is made longer than in the ordinary form of flooring cramp, and some small details of construction are introduced which may be generally regarded as improvements.

2,338, Improvements in Ornamenting Glass. J. Sherrin.

Pieces of glass of various colours are cemented on sheets of glass blinds to doors and windows, and for similar purposes. The pieces are cut into different shapes, and on each piece is put a little cement; it is then placed on a sheet of glass the size of the window, and various pieces added in the same way until the pattern is complete.

2,012, Improvements in the Construction of Sash Pulleys. W. J. Penny.

The object of the invention is to afford a ready means of taking out the pulley-wheel from a sash or other pulley, which would greatly facilitate the execution of repairs when needed. The pulley-wheel is cast with a short central spindle on which are afterwards formed two rims or shoulders, one on each side. The face-plate and pulley-box is cast in one with two recessed apertures and bearings in the sides of the pulley-box. The opening in the face-plate, wherein the pulley-wheel, is inserted is recessed to a sufficient width to allow the arms of the pulley-spindle to pass through and drop down into the recessed apertures in the sides of the pulley-box. When the pulley-wheel is to be removed a bradawl or other pointed tool is inserted in a hole made in the periphery of the pulley-wheel, and the pulley-spindle is then lifted over the recessed bearings and the pulley-wheel taken out.

822, Chimney Cowl and Roof Ventilator. A. C. Smith.

The ventilator head is made with any required number of concentric conical guard-rings tapering inward and upward, and with bands fixed to their edges. The first guard-ring overlaps the top of the main shaft, and they are formed so as to leave a central passage upward for the smoke, &c. Vertical guides, at equal distances apart, are fixed between the guard-rings, reaching in an oblique direction from the outer edge almost to the inner edge of the guard-rings, thus causing wind and air to take an upward course. The top may be provided with a cap, with or without a depending curtain.

4,161, Chain Pulleys. R. J. Smith.

Relates to the means of renewing the working parts. For this purpose, in the case of large pulleys the teeth are bolted separately or in series inside the goove of a suitably-turned drum. In the case of smaller pulleys semicircular faced pieces having cupped recesses are bolted against the sides of a central groove. In either case the grooved pulley has radial feathers, wearing-pieces, and key-ways for the same, for the purpose of rendering them immovable in their position.

APPLICATIONS FOR LETTERS PATENT.

Jan. 2.—70, E. R. Wethered, Improvements in Door Lock Furniture.—73, W. Sanderson and T. A. Moffit, Door Latches and Catches.—77, J. H. Stone, Improvements in Call and other Bells.—82, H. Curzon, Preventing the Bursting of Water-pipes from Frost.

Jan. 3.—108, F. Thompson, Improvements in Pocket Saws.—117, J. Bennison, Chimney Pots for Preventing Down-draught and Curing Smoky Chimneys.—136, A. M. Clark, an Improved Girder.

Jan. 5.—145, J. Tulloch and T. Tulloch, Incombustible Composition for Finishing the Interiors of Buildings.—160, T. E. Fielder, Brick Mould Stock.

Jan. 6.—171, L. Coke, Improvements in Stoves.—202, A. J. Boult, Improvements in Stoves.—212, H. Salomo, Carrier for Wood-turning Lathes.—217, W. Court, Wood-block Flooring.

Jan. 7.—230, B. Goulton, Improvements in Locks.

Jan. 8.—255, T. Thornton, Window Fasteners.—264, J. Walker, Cupboards and other Door Fastenings.

PROVISIONAL SPECIFICATIONS ACCEPTED.

8,108, W. M. Hawkins, Improvements in the Construction of Buildings.—11,858, W. R. Lake, Protection of Wood or other Materials from Fire.—14,522, F. Jupp, Pneumatic Door-closer.—14,648, J. Samuel, Metallic Roofing Slate.—14,712, J. Meorath, Erection of Fireproof Buildings.—14,847, T. Hawkins, Improved Method of Glazing.—14,909, P. Bawden, Machinery for the Manufacture of Bricks and Tiles.—15,324, G. Usill, Pipe Joints and Jointing.—15,334, F. Hobbs, Cement for Lead Light Glazing.—15,927, J. King, Apparatus for Closing and Preventing the Slamming of Doors.—16,154, J. Ball, J. Rawson, and F. Rawson, Manufacture of Chisels, Gouges, and Augers.—15,197, E. Turner and J. Reynolds, Combined Circular Rack and Band Machine for Sawing Timber.—15,204, W. Chynowith, Stop Chamfer and other Wood-working Planes.—15,488, C. Hett, Connexion for Water-closets.—15,753, J. Campbell, Ladders or Steps.—15,954, M. Ker, Raising and Suspending Venetian Blinds.—16,068, B. Turner, Door Springs.—16,670, J. Webb and F. Smith, Collar-joint for Sewer and Drain Pipes.—16,950, W. Smith, Manufacture of Portland Cement.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to opposition for two months.

1,322, F. Oldfield, Improvements in Sliding Windows or Sashes.—2,413, D. Griffiths, Improved Roofs.—3,814, W. H. Tylor, Drain Traps.—3,971, E. Pearson, Water-closets.—4,576, A. Chesterman, Improvements in Hinges.—4,720, S. Wilding, Machines for Shaping or Sharpening the Teeth of Saws.—5,080, W. Cunliffe, Imitation Stained Glass.—8,172, W. Greenwood, C. Mitchell, and H. Lund, Weather Bars for Doors.—14,087, J. Farthing and J. Lorrimer, Artificial Asphalte.—3,352, F. Howcroft, Supporting Window Sashes.—4,063, J. Phillips, Gully Tank and Trap.—4,570, S. Slater, Door-sill Brasses and Securing Same.—4,649, G. Paine, Apparatus for Opening and Closing Swing Sashes, Shutters, and Doors.—4,877, A. Bicknell, Apparatus for Cutting or Surfacing Wood Pavement.—4,973, S. Skinner, Sawing Machinery.—8,749, J. Adams, Door Springs.—15,354, J. Holroyd, Construction of Sewers.—15,729, M. Adams, Ventilating and Disinfecting Apparatus for Sewers, Drains, &c.

The Institution of Civil Engineers.—The newly-elected Council have re-appointed Mr. H. L. Antrobus, the senior partner of Messrs. Coutts & Co., as treasurer, and Mr. James Forrest as the secretary. At the same time Dr. William Pole, F.R.S., was appointed honorary secretary, in the room of the late Mr. Charles Manby.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

JANUARY 5.

By W. H. S. GILBERT & Co.

Green Street-green, Kent—Five freehold cottages..	£750

JANUARY 7.

By S. WALKER & RUNTZ.

Rotherhithe—14, 16, and 18, Trident-street, 66 years, ground-rent 7*l.* 10s.	415
23 to 33, odd, Trident-street, 66 years, ground-rent 15*l.*	865
Shepherd's-bush—138, Coningham-road, 79 years, ground-rent 9*l.*	275

By SCHOFIELD, ORMES, & BUCKLEY.

The reversion of one-fourth of one-eighth share of a ground-rent of 250*l.* a year, also to the same share of the premises falling-in in 1946	68

JANUARY 8.

By E. & S. SMITH.

Stoke Newington—51, Green-lanes, 39 years, ground-rent, 5*l.* 5s.	245
Enfield, Upper Gordon-road—Two plots of freehold land	60

JANUARY 12.

By J. SPARROW.

Homerton—40, High-street, freehold	400

By E. E. CROUCHER & Co.

Dalston—2, Fassett-road, 67 years, ground-rent 4*l.* 10s.	340
Clerkenwell—10 & 11, Wilmington-place, and a ground-rent of 4*l.* per annum, 30 years, ground-rent 30*l.*	270

JANUARY 13.

By VENTOM, BULL, & COOPER.

Bayswater—56, Chepstow Villas, freehold	1,325
Hastings (near)—Fairlight Cottage, with meadow, 27 years, ground-rent 1*l.* 10s.	560

By G. F. CALVERT.

New North-road—58 & 60, South-street, and South Cottage in the rear, 24 years, ground-rent 13*l.* 10s.	455

JANUARY 14.

By E. W. RICHARDSON.

Clapton—3, Castlewood-road, 84 years, ground-rent 12*l.*	550
Bow—51, Turner's-road, 80 years, ground-rent, 4*l.* 10s.	300
Bethnal-green—120, 122, 124, & 126, Old Bethnal-Green-road, and 1, George-street, 72 years, ground-rent 65*l.*	1,200

By TOPLIS & HARDING.

Lewisham—Freehold building site, containing 2a. 0r. 18p.	2,420

By W. B. CRANFIELD.

Enfield—Bycullah-road, Geldard House, freehold...	1,350

MEETINGS.

MONDAY, JAN. 19.

Royal Institute of British Architects.—Mr. William White on "The Fireproof Closing of Openings in Party-walls under the Metropolitan Building Act." 8 p.m.

Royal Asiatic Society.—4 p.m.

Society of Arts (Cantor Lectures).—Dr. G. V. Poore on "Climate and its Relation to Health" (II. "The Effects of Soil, Drainage, and Vegetation upon Climate"). 8 p.m.

TUESDAY, JAN. 20.

Institution of Civil Engineers.—Mr. A. Hamilton-Smythe on "A Comparison of British and Metric Measures for Engineering Purposes." 8 p.m.

Statistical Society.—Dr. Robert Giffen will read some "Further Notes on the Progress of the Working Classes." 7.45 p.m.

WEDNESDAY, JAN. 21.

Builders' Foremen and Clerks of Works Institution (9, Conduit-street, W.).—Annual Meeting. 8.30 p.m.

British Archæological Association. — (1) Mr. H. Syer-Cuming on "St. Milburga, Abbess of Wenlock." (2) Mr. C. Lynam on "The Inscription on the Carew Cross." 8 p.m.

Royal Meteorological Society.—Annual Meeting. 7 p.m.

Society of Arts.—Mr. D. Pidgeon on "Labour and Wages in the United States." 8 p.m.

THURSDAY, JAN. 22.

Society of Antiquaries.—8.30 p.m.

Society of Arts (Howard Lectures).—Mr. W. Anderson on "The Conversion of Heat into Useful Work." IV. 8 p.m.

SATURDAY, JAN. 24.

Architectural Association. — Visit to St. Marylebone Parish Church. 3 p.m.

Miscellanea.

Middlesex Hospital Extension. — The hydrofuge parquet, which is damp-proof, sound-proof, and fire-proof, and the mosaic pavements at the above, have been executed by Mr. Jos. F. Ebner, Clerkenwell-road, London.

Liverpool.—The Turner Memorial Home for Incurables, designed by Mr. A. Waterhouse, A.R.A., is now approaching completion, and has had erected in the chapel a reredos of alabaster. In the three central compartments, carved in white alabaster, are the subjects of Christ Healing the Sick and Lame, Christ giving Speech to the Dumb, and Christ restoring Sight to the Blind. This work has been executed by Messrs. Earp, Son, & Hobbs, of London and Manchester.

Baptist Church, Hendon.—The committee for building a new Baptist Chapel at Hendon have referred the designs received in competition to a professional assessor for advice, having for that purpose appointed Mr. Banister Fletcher.

British Archæological Association.—At the meeting on Wednesday, the 7th inst., Mr. Geo. R. Wright, F.S.A., in the chair, Mr. C. Lynam sent a cast of the inscription on the cross at Carew, and drawings of another cross at Penally, visited during the Congress. Mr. J. H. Whieldon sent further details of the Roman Bridge at Collingham, which will be published in the next part of the *Journal*. The Chairman referred to some seventeenth-century carvings which were taken down from Goathurst Church, Somerset, and which, although still in the building, were now for sale. The importance of retaining these in the church was urged by many speakers. Mr. Loftus Brock, F.S.A., referred to the collection of baluster shafts found in the walls of Jarrow Church during the rebuilding, and now preserved in the porch. A Saxon date has been given to these, but their resemblance to Roman work was pointed out. They were probably derived from the Roman buildings in the locality, as was the case at the Saxon Church, Dover, and the transepts of St. Alban's Abbey. The discussion upon the charities of the Royal Almonry, adjourned from the last meeting, was brought to a close. A paper was then read by Mr. C. Lynam on the recent excavation of the site of the Abbey of Hulton, Staffordshire. The whole arrangement of the church and the conventual buildings has been recovered, and the site has been again filled in after careful measurement, the plans being produced.

International Inventions Exhibition.—The Council of the Society of Arts announce that they will award the following Gold Medals in connexion with the International Inventions Exhibition:—Under the Joint Stock Trust, one Gold Medal for the best application of Photography to a Permanent Printing Process; Group XXVI., Class 140; Group XXIX., Class 159. Under the Howard Trust, five Gold Medals for the best exhibits (coming within the terms of the Trust) in the following classes:—One for the best exhibit in Group IV., "Prime Movers," Class 26,—Steam Engines and Boilers; one for the best exhibit in Group IV., Class 27,—Gas and Air Engines; one for the best exhibit in Group IV., Class 28,—Means of Utilising Natural Forces; one for the best exhibit in Group XI., "Hydraulic Machines," &c., Classes 59 to 62; one for the best exhibit in Group XIII., "Electricity," Class 72,—Distribution and Utilisation of Power." Under the Fothergill Trust, one Gold Medal for the most novel and best exhibit in Group XXVIII., "Philosophical Instruments and Apparatus," Classes 148 to 158. Under the Alfred Davis Trust, three Gold Medals to be awarded in Division II. of the Exhibition (Music), Groups XXXII. to XXXIV., Classes 166 to 180. The Council propose to ask the juries in each class to recommend for their consideration either two or three exhibits which they might consider deserving a prize. It will not be necessary for any special application to be made in respect of these prizes. The medals are each of the value of 20*l.*

The Widening of New Broad Street.—Several new buildings are at present in course of erection in connexion with the widening of New Broad-street to the extent of 8 ft. Nearly all the premises required for the purpose of widening the street have now been taken down, and amongst other new structures now in progress is an extensive block of buildings at the corner of New Broad-street West, and Old Broad-street, having a frontage to the first-named street of about 45 ft. in length, and running southwards along Old Broad-street, in the direction of London Wall. The buildings are faced with red brick and Portland stone, and are intended for offices. Mr. Edwin T. Hall, of Moorgate-street, is the architect, and Messrs. W. Bangs & Co., of Bow, are the contractors.

A New Architectural Work.—Mr. Owen W. Davis, architect, is (as will be seen by an advertisement in another column) about to publish, by subscription, "Art and Work," containing about 550 examples of antique, Italian, Renaissance, "Adam," Oriental, and modern work, in marble, stone, metal, wood, colour, &c.

West Sussex County Surveyorship.—At the Court of Quarter Sessions for West Sussex held on the 8th inst., Mr. Ellice-Clark, M. Inst. C.E., was unanimously elected County Surveyor. Mr. Ellice-Clark will continue to hold his position as Engineer and Surveyor to the Hove Commissioners.

London and Middlesex Archæological Society.—At a meeting of this Society held on Monday evening at King's College, Mr. Alfred White presiding, Professor John W. Hales read a paper entitled, "Notes on the Anglo-Saxon Charters relating to Hampstead." Professor Hales said that it was a curious fact that what was now to be the borough of Hampstead had existed within the same boundaries as the manor of Hampstead one hundred years before the Norman conquest. The first charter relating to Hampstead was granted by King Edgar, and the second by King Athelred. The date of the first was 986; it had been known for many years, and the original itself existed in the archives of Westminster. The second charter, which had been only lately known, was amongst the Ashburnham manuscripts, which had been secured to the nation, and were now in the British Museum. Parkes, in his history of Hampstead, had supposed that the charter of Athelred was a forgery, but he (Professor Hales) thought they might fairly believe in its genuineness. It bore the signature of the king's wife Elfrida, and granted the manor of Hampstead to a certain person named Mangola, whose identity had not hitherto been traced. The second charter confirmed the grant of the first, which set out the limits of Hampstead. Mr. E. P. Seaton, resident engineer of the Metropolitan (Inner Circle) Railway, read a paper on the discoveries made in the excavations in forming the extension of the new line to the Tower.

The Supply of Natural Gas in America. There exists a belief that the natural gas supply of the United States will soon be exhausted; but, from what has recently been stated in American contemporaries, this does not appear to be the case. Within the last few weeks reports have been received from Pittsburgh, Pennsylvania, Cleveland and Findlay, Ohio, Mitchell, Dakota Territory, and at least two points in Alabama, announcing the discovery of natural gas wells. Scarcely a day is said to pass without the discovery of a new well in some portion of the country. The remarkable deposits in western Pennsylvania and eastern Ohio are well known to the reading public, and a great and growing industry is in process of development. Possibly it may be an extravagant statement, but it is believed that the discovery of natural gas in Pensylvania is only second in importance to that of coal oil. It is a well-attested fact that the town of Fredonia, New York, has been lighted by the same gas well for more than forty years, and we are told that the Chinese have been using certain gas-wells for 4,000 years, and that they still yield a good supply. It is only a few months since American geologists affirmed that the natural-gas belt did not extend beyond Pittsburgh, and yet successful wells are now in operation at Cleveland, Steubenville, Findlay, and other points in Ohio.—*Iron.*

Free Lectures to Artisans. — The Carpenters' Company announce a course of eight lectures to be given at their Hall, London-wall, free to artisans and others connected with the building trade. The first will be delivered by Professor Kerr, of King's College, on Wednesday, February 11th, at eight o'clock, when the subject will be "The Comparative Anatomy of Beams, Trusses, and Arches." Tickets for the course can be obtained at the Hall of the Company after January 21st.

Royal Victoria Coffee-hall.—The frequenters of the Science Lectures at the above hall will be glad to learn that they were resumed on Jan. 13th, when Prof. H. G. Seeley, F.R.S., lectured on "More about the Sun"; and on Jan. 27th Commander Cameron will lecture on "How I got from the East to the West Coast of Africa."

Albo-Carbon Light.—We understand that the Italian Church, Hatton Garden, has just been lighted with the Albo-Carbon light by the Sanitary Engineering and Ventilation Company, of Westminster, who also recently applied the same system of lighting to the New Oratory, South Kensington, and several picture galleries, &c.

Incorporated Society of British Artists. At a special assembly of the Incorporated Society of British Artists, held on Monday evening last, Mr. W. T. Dannat was elected a member.

School Furniture.—We learn that the North of England School Furnishing Company (Limited), of Darlington and Newcastle, have opened a London depôt at 121, Newgate-street.

"Climate in its Relation to Health." The first of three Cantor Lectures, on "Climate in its Relation to Health," was given at the rooms of the Society of Arts, on Monday evening last, by Dr. G. V. Poore. The lecturer began by directing attention to the chemical composition of the atmosphere, and its comparatively slight variation in different localities. The composition of the air in dwellings and in crowded rooms showed, no doubt, a degree of impurity which was often considerable, but the composition of the open air was, for practical purposes, everywhere identical, and it was not probable that the slight variations in the proportions of the component gases which had been observed could have any recognisable effect upon health. The watery vapour present in the air, and its great importance in moderating extremes of temperature, and in its relation to rain, dew, or fog, was fully discussed. Humidity of the air affected our sense of well-being very materially, and indirectly the dryness or moistness of the air had, doubtless, a great influence on health, because of the power of dry air to check, and of moist air to foster, the process of putrefaction, which had such an important direct connexion with many forms of zymotic disease. The causes of the great variations in the temperature of different localities was discussed at length, and the effect of various collateral circumstances in moderating the sun's influence, and in lessening the extremes of cold, were explained. A healthy man seemed to be capable of withstanding the extremes of temperature, and it was doubtful whether a large proportion of cases of sunstroke were not encouraged by dietetic or hygienic errors.

Flying Ambulances in Paris.—Dr. Henri Nachtel, though an American, has succeeded in starting an agitation in Paris in favour of organising town ambulances on the American model. An influential temporary committee has been formed for this purpose, on which we find the names of Dr. Pasteur, Dr. Berthelot. Dr. Guérin, Dr. Béclard, Baron Larrey, Senator Kœchlin Schwartz, the former Prime Minister M. Jules Simon, and the well-known journalists MM. Lockroy, John Lemoinne, E. Magnier, &c. A recent meeting of this committee was held under the presidency of M. Jules Simon, when Dr. Nachtel exposed his scheme. He proposed to establish two methods of communicating with the hospitals in case of accidents. First, when there is no extreme urgency, the local police station would supply means of telegraphing to the nearest hospital to send an ambulance. Secondly, when there is not a moment to be lost, or the case is too serious to bear transportation to the police station, telegraphic posts, similar to the fire alarms placed in the streets, might be employed. A number of red boxes or pillars in all the principal streets could be opened by a key kept in the nearest shop, and the alarm given. On the receipt of this signal an ambulance should be ready to start in forty-two seconds, horses being kept day and night in harness. The house-surgeon would accompany the ambulance. It was further proposed to raise a fund by voluntary subscriptions to start this service; and a magnificent *fête* will forthwith be organised, the proceeds to be devoted to this purpose.—*Lancet.*

Iron Girders.—We have received Messrs. Measures Bros.' annual calendar card, containing numbered sections of girders and other iron-work; a useful form of list for immediate reference. We observe that Messrs. Measures, in their sections of iron and concrete floors, retain the beams with the usual upper flange section. It is question at least (some theorists think there is a no question about it) whether this is not waste of weight and material in the iron, concrete having, of course, a very considerable resistance to compression strain, which must materially help the upper flange of the beam, even if it do not abrogate the necessity for an upper flange at all. The error is one on the side of strength, no doubt, but not on that of economy.

Hydraulic Lift, Eastcheap. — Messrs. Archibald Smith & Stevens, of Queen's-road, Battersea, have been instructed by the Aërated Bread Company to erect at their new premises, Eastcheap House, Eastcheap, one of Stevens & Major's Patent Hydraulic Balance Passenger Lifts, with compensating apparatus for reducing the amount of water used. The architect of the building is Mr. George Edwards, of Brompton-road.

Directories.—The progress of electric work in commercial importance is strikingly indicated in the volume in which Berly's "Universal Electrical Directory for 1885" is comprised. It professes to be a complete record of all the industries directly or indirectly connected with electricity and magnetism, and is a most voluminous and almost alarming compilation. Among other works of the same class, we have the "Railway Diary and Officials' Directory for the present year," giving the returns of traffic and particulars of the constitution and the official staff of every railway company, &c.

Church Clocks.—A large clock has just been completed at Alston Church, Staffordshire, by Messrs. John Smith & Sons, Midland Steam Clock Works, Derby. It strikes the hours upon a large bell, and has two dials facing south and west. The same firm have also just erected a similar clock at Rolleston Church, Staffordshire.——At Helpston, Peterborough, a large clock has just been erected in the church by Messrs. Smith. It strikes the hours upon a large bell and has one large dial. These clocks are fitted with all the latest improvements, and are not to vary more than fifteen seconds a month.

CONTRACTS AND PUBLIC APPOINTMENTS.

Epitome of Advertisements in this Number.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Execution of Works, and Supply of Materials	Wandsworth B. of Wks.	*Official*	Jan. 20th	ii.
Erection of Warehouse	Messrs. Goodall & Co..	T. Winn	Jan. 21st	xx.
Granite Kerb, Kentish Flints, Pipes, &c.	Barking Town Locl Brd	C. I. Dawson	Jan. 22nd	i.
Supply of Broken Granite Kerb, Cubes, Broken Flints, and for Laying Tar Paving, &c.	Kingston-on-Thames Corporation	*Official*	Jan. 26th	ii.
Glass for Locomotives and Windows of Railway Carriages	Director-General of Stores for India	do.	Jan. 27th	i.
Execution of Works	Hackney Board of Wks	J. Lovegrove	Jan. 28th	ii.
Erection of Two small Bridges	Grdns of Poor, Chelsea	A. & C. Harston	do.	ii.
New Granite Carriageway, &c.	Met. Board of Works	*Official*	Jan. 29th	ii.
Excavating, &c., Beulah Park Estate	Not stated	W. Newton Dunn	Feb. 4th	xx.
Painting Work, and Repairs to Swimming Bath	Com. of P. B. & W. Parish of St. James, Westmnstr	H. Monson	do.	i.
Brick Sewers	Met. Board of Works	*Official*	Feb. 5th	ii.
Bricklayer, Mason, Carpenter's, &c., work, Darlington	North Eastern Railway	W. Bell	Feb. 18th	ii.
Corporation Sewage Works	Bedford U. S. A.	J. Lund	Feb. 24th	ii.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.	Page.
Town Surveyor and Inspector of Nuisances	Leominster U. S. A.	120*l.*	Jan. 29th	xviii.
County Surveyor	Norfolk	500*l.*	Jan. 31st	xviii.

TENDERS.

For alterations at the Public Baths and Washhouses, Spa-road, Bermondsey. Messrs. Geo. Elkington & Son, architects. Quantities supplied by Mr. Henry Smith:—

W. J. Botterill	£7,326 0 0
Scrivener & Co.	6,464 0 0
B. E. Nightingale	6,323 0 0
W. Johnson	6,278 0 0
J. Marsland	6,105 0 0
J. Bentley	6,091 0 0
J. & C. Bowyer	6,025 0 0
W. Martin	5,950 0 0
H. L. Holloway	5,875 0 0
Tarrant & Son	5,793 0 0
J. Tyerman	5,735 0 0
Smith & Sons	5,720 0 0
Howell & Son	5,687 0 0
D. D. & A. Brown	5,683 0 0
Hann & Co.	5,606 0 0
F. Deacon	5,600 0 0
F. Higgs	5,400 0 0
G. Stephenson	5,287 0 0
Smith & Barnes	5,109 0 0
J. Bullers	5,083 0 0
W. Smith	4,905 0 0
W. Schofield	4,675 0 0
J. Stayner (accepted)	4,660 0 0

Contract No. 2.

	Porcelain Baths.	Deduct if Iron Baths.	Engine and Gear.	Old Mtrls.
Jeakes	£3,400 0 ...	£54 ...	£160 0 ...	£—
Bradford & Co.	2,727 0 ...	81 ...	157 0 ...	—
Frazer	2,595 0 ...	165 ...	130 0 ...	—
Bottrill	2,153 0 ...	20 ...	200 0 ...	—
Busbry	2,134 0 ...	125 ...	120 0 ...	20
Smith & Barnes	2,012 0 ...	182 ...	120 0 ...	—
Thomas & Taylor.	1,967 0 ...	36 ...	164 3 ...	—
G. Elliott	1,956 0 ...	104 ...	120 0 ...	—
Seaton	1,916 0 ...	104 ...	130 0 ...	—
May	1,900 13 ...	147 ...	99 10 ...	—
Pratt & Reynolds	1,825 0 ...	180 ...	170 0 ...	20
Thompson, Leeds	1,050	No alternative.		

For the erection of a new house, &c., at Sandhurst, Berks, for Lieut.-Col. Harvey. Mr. W. Ravenscroft, architect, 6, Market-place, Reading. Quantities supplied by Messrs. Cooper & Sons, surveyors, Maidenhead and Reading:—

Bottrill, Reading	£6,591 16 10

For new wards, &c., to the Infectious Hospital, Hillingdon, for the Uxbridge Joint Hospital Board. Mr. Bertram Freeman, Surveyor to the Board. No quantities:—

Ham & Co., Windsor	£2,182 0 0
C. F. Kearley, Uxbridge	1,618 0 0
J. Hardy, Cowley	1,447 0 0
F. Taylor, Uxbridge	1,443 0 0
W. Brown, Southall	1,435 0 0
C. Brown, Harefield	1,350 0 0
P. Bell, Southall	1,295 0 0
Scharien & Williams, South Kensington	1,287 0 0
A. & B. Hanson, Southall*	1,274 0 0
F. Quinion, Southall	1,250 0 0

* Accepted.

For the erection of new schools, including teachers' residences, boundary-walls, gates, &c., proposed to be erected by the Egham School Board, at Egham Hythe. Mr. E. Harnor, architect, John-street, Adelphi:—

Knight & Sons, Chertsey	£4,900 0 0
W. Reavell, Windsor	4,542 0 0
G. Reavell, Staines	4,380 0 0
Green Bros., Colnbrook	3,885 17 6
F. Akery, Windsor	3,844 0 0
A. L. Oades & Sons, Egham	3,655 0 0
A. Simpson, Egham	3,615 0 0
Hann & Co., Old Windsor	3,479 0 0

For the erection of two houses on the Earlsfield Estate, S.W., for Mr. H. W. Keatch. Mr. Wm. P. Miller, architect, Wandsworth-common:—

Spencer (accepted)	£750 0 0

For the erection of a house and shop at Barmouth, for Mrs. Edwards. Mr. Thomas Roberts, Assoc.-M. Inst. C.E. architect:—

Jones, Criccieth	£1,727 11 0
Hughes, Portmadoc	1,660 0 0
Griffiths, Criccieth	1,570 0 0
Edwards, Barmouth	1,557 0 0
Jones, Portmadoc	1,553 0 0
Thomas & Parry, Llanbedr	1,512 0 0
Davies, Barmouth	1,469 0 0
Evans, Harlech	1,445 0 0
Jones & Edwards, Barmouth	1,441 11 0
Roberts & Williams, Talsarnau and Harlech	1,420 0 0
Owens, Barmouth	1,384 0 0

[Architect's estimate, 1,449*l.*]

For King's Heath and Greenhill sewerage, for the King's Norton Rural Sanitary Authority. Mr. R. Godfrey, engineer. Quantities supplied:—

W. Heaps, jun., Birmingham	£7,234 13 4
Currall & Lewis, Birmingham	6,926 5 0
J. White, Handsworth	6,755 6 6½
Pearson & Golightly, Birmingham	6,754 8 7
Cooke & Co., London	6,272 7 4
G. Law, Kidderminster	5,701 18 7
J. Biggs, Handsworth (accepted)	5,540 14 5

[Engineer's estimate, 6,121*l.* 15s.]

For the erection of offices for the Guarantee Society, 19, Birchin-lane, E.C. Mr. Edwin A. B. Crockett, architect, 16, Mark-lane. Quantities supplied:—

Holland & Hannen	£8,996 0 0
Colls & Son	8,390 0 0
Bangs & Co. (executors)	8,360 0 0
E. Conder	8,199 0 0
W. Brass	7,593 0 0
Rider & Sons	7,580 0 0
Lawrence & Sons	7,450 0 0
J. & J. Greenwood	7,449 0 0
Ashby & Horner (accepted)	7,240 0 0

For detached house, Farnham-road, Guildford, for Mr. S. Farnfield. Mr. A. B. Harding, architect:—

Hill & Downes	£945 0 0
Strudwick	925 0 0
Currington & Peto	915 0 0
Kingerlee	897 0 0
T. Downes	850 0 0
Banham	839 0 0
G. & R. Smith (accepted)	837 0 0

For Montem-street Schools, for the School Board for London. Mr. E. R. Robson, architect. Messrs. Barber, Boxall, & Barber, surveyors :—

Patman & Co.	£15,093	0	0
Howell	14,140	0	0
Wood	13,939	0	0
Hart	13,225	0	0
Kerley	13,222	0	0
Shurmur	12,987	0	0
Stimpson	12,860	0	0
Oldrey	12,700	0	0
Goodman	12,637	0	0
Tongue	12,625	0	0
Downs	12 526	0	0
Bangs	12,524	0	0
Cox	12,460	0	0
Niblett	12,434	0	0
Grover	12,427	0	0
Lathey	12,381	0	0
Croaker	12,374	0	0
Wall Bros.	12,280	0	0
Scrivener & Co.	12,172	0	0
Jerrard	12,121	0	0
Atherton & Latta	12,100	0	0
C. Wall	12,080	0	0

For the Hindle-street Schools, for the School Board for London. Mr. E. R. Robson, architect :—

Wood	£8,784	0	0
Larter	8,746	0	0
Turtle & Appleton	8,570	0	0
Croaker	8,228	0	0
Kerley	8,113	0	0
Steel Bros.	7,993	19	0
Wall Bros.	7,977	0	0
Kirk & Randall	7,950	0	0
Pritchard & Son	7,899	0	0
Shurmur	7,884	0	0
Bangs & Co.	7,877	0	0
Howell	7,826	0	0
Grover	7,788	0	0
Palmer	7,777	0	0
Lathey Bros.	7,767	0	0
Patman & Co.	7,723	0	0
Jerrard	7,693	0	0
Sargent	7,680	0	0
Hunt	7,609	0	0
Smith	7,597	0	0
Stimpson	7,530	0	0
C. Cox	7,524	0	0
W. Oldrey	7,400	0	0
Atherton & Latta	7,400	0	0

For repairs to No. 1, Cambridge Villas, and No. 1, Gordon Villas, Wiverton-road, Sydenham, for Mr. W. Boydell. Mr. Walter Hall, surveyor, Chancery-lane :—

Pestell	£465	0	0
Thomas & Cardus	400	0	0
Leeks	398	0	0
Searchfield	386	0	0

For the erection of new Club Premises for the Royal Southampton Yacht Club, Above-bar-street, Southampton. Mr. W. H. Mitchell, architect, 8, Portland-street, Southampton :—

	Without Tower.	Tower.	Total.
W. H. Chapman	£4,461	£422	£4,883
Stevens & Sons	4,427	357	4,784
J. Dyer	4,410	307	4,717
J. W. Rowland	4,129	340	4,469
H. J. Sanders	4,098	348	4,446
J. Bull, Sons, & Co.	4,089	348	4,437
J. Crook	3,987	342	4,329

[All of Southampton.]

For the erection of villa residence, Birkenhead-avenue, Kingston, for Mr. W. Hall. Mr. H. J. White, architect, Wallington, Surrey :—

J. Horrocks, Croydon (accepted)	£600	0	0

Accepted for forming new roads and sewers, &c., Regent's Park-road Estate, Finchley, for the Directors of the Birkbeck Freehold Land Society. Mr. Sydney B. Grosvenor, surveyor, 23, Southampton-buildings, W.C. :—

P. Pound	£3,854	0	0

[No competition.]

For alterations and additions to Moray House, Blackheath, for Mr. J. Macdugall. Mr. J. T. Barker, architect, No. 8, Furnival's Inn. Quantities supplied by Mr. H. Burton :—

S. J. Jerrard	£2,849	0	0
Holliday & Greenwood	2,689	0	0
W. Smith	2,577	0	0
Smith & Son	2,567	0	0
J. Beale (accepted)	2,554	0	0

Acton Main Drainage.—Mr. Rowles writes to say that his total should be 36,723*l.*, not 37,623*l.*

SPECIAL NOTICE.—Lists of Tenders frequently reach us too late for insertion. They should be delivered at our Office, 46, Catherine-street, W.C., *not later than Four p.m.* on THURSDAYS.

TO CORRESPONDENTS.

N. H. J. W. (thanks).—F. & G. H.—G. H. J.—E. S. R.—M. and T.—W. H. B.—H. H. B. (too late for this week).—C. R. A.—T. R. S.—G. G. W.—A. F. O.—W. S. S.—W. & J. R. C.—A. W.

All statements of facts lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read a public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

PUBLISHER'S NOTICES.

THE INDEX and TITLE-PAGE for Volume XLVII. (July to December, 1884) were given, as a Supplement, with the Number for January 10.

A COLOURED TITLE-PAGE may be had, gratis, on personal application at the Office.

CLOTH CASES for Binding the Numbers are now ready, price 2s. 6d. each; also

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Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

SPECIAL.—ALTERATIONS in STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same, must reach the Office before TEN o'clock on WEDNESDAY mornings.

PERSONS Advertising in "The Builder," may have *Replies addressed to the Office*, 46, Catherine-street, Covent-garden, W.C. *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage.

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"THE BUILDER" is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum, PREPAID. To countries within the Postal Union, 26s. per annum. Remittances payable to DOUGLAS FOURDRINIER, Publisher, No. 46, Catherine-street, W.C

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Box Ground, Combe Down,
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RANDELL, SAUNDERS, & CO., Limited,
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150,000 FEET CUBE.
PICTOR & SONS,
BOX, WILTS.
[ADVT.

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Greater facilities have been provided for working these quarries, and the stone can be supplied in large quantities at short notice.
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Doulting Free Stone HAM HILL STONE, **BLUE LIAS LIME** (Ground or Lump), For prices, &c., address S. & J. STAPLE, Quarry Owners, Stone and Lime Merchants, Stoke-under-Ham, Ilminster. [ADVT.

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Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 38, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and milk-rooms, granaries, tun-rooms, and terraces. [ADVT.

Asphalte.
Seyssel, Patent Metallic Lava, and White Asphaltes.
M. STODART & CO.
Office:
No. 90, Cannon-street, E.C. [ADVT.

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Seasoned Woods and Veneers in very large quantities.
B. J. HUDSON & SONS,
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Great Peter-street, S.W., London.
Telephone No. 3,654, and Private Wire connecting Business Premises.

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J. A. BERLY'S
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Price 10s.] FOR 1885. [Price 10s.
This book contains, amongst other trades, a very complete list of Manufacturers of Electric Bells, Alarms, and other Electrical Domestic Appliances.
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